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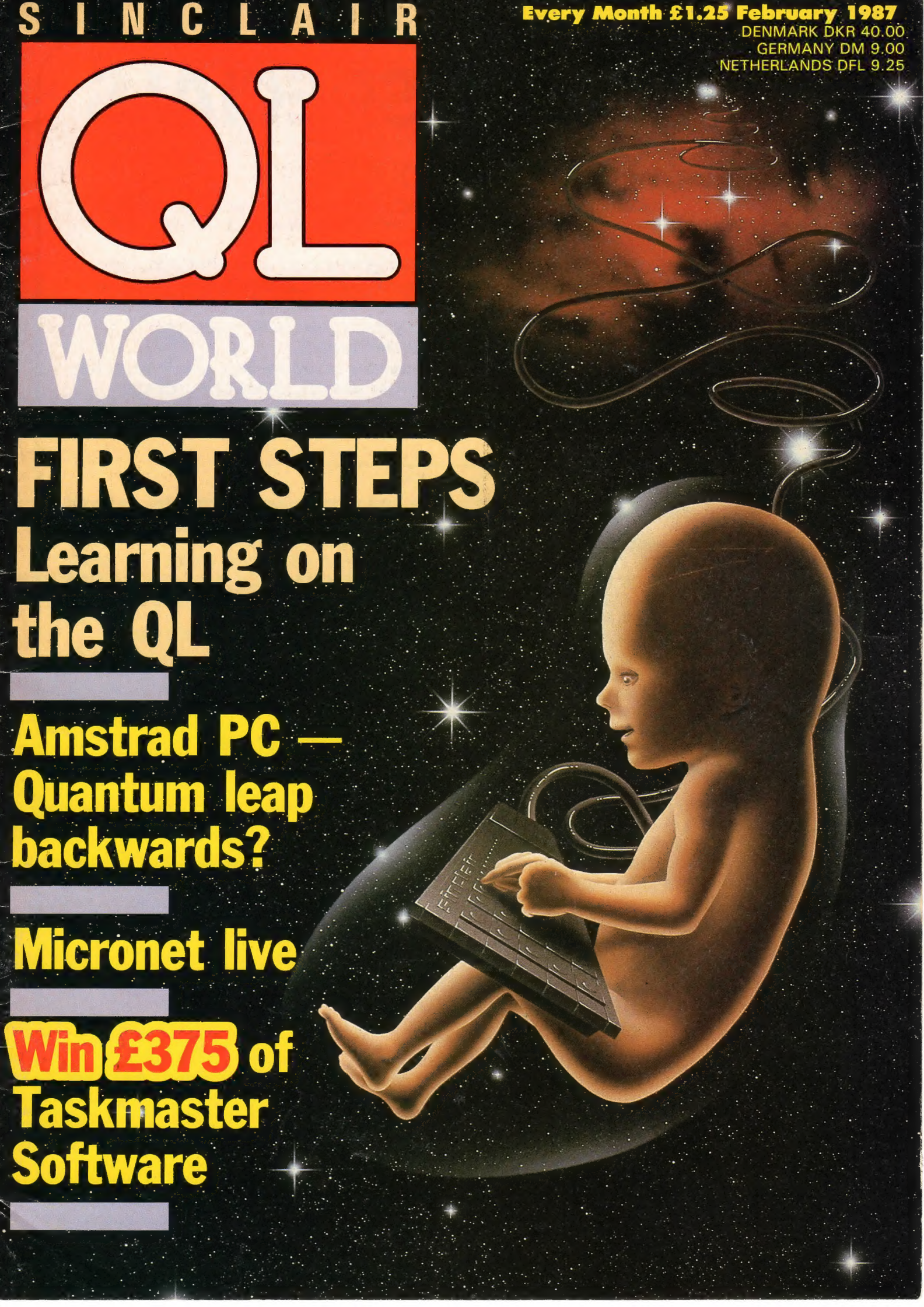
QL WORLD
Every Month £1.25 February 1987
DENMARK DKR 40.00
GERMANY DM 9.00
NETHERLANDS DFL 9.25



FIRST STEPS
Learning on the QL

Amstrad PC — Quantum leap backwards?

Micronet live

Win £375 of Taskmaster Software

SANDY QL SPECIALS

—NEW PRODUCTS—

SUPERMOUSE FOR SUPERBOARDS — factory fitted upgrade provides high quality mouse with full pointer/real windowing/multi-tasking front end plus QRAM UTILITIES from QJUMP and CADPAK graphics program.

SUPERDISK — 3.5″/5.25″ disk interface & parallel printer port with RAMDISKS, disk management utilities: compatible with all memory expansions/ROMs — tremendous value!

QROM — the ultimate QL ROM disassembly fully explained with notes and examples — essential reading for every serious enthusiast.

QPLUS+ — customise your QL front end — generates a system disk or microdrive to match your exact set up. Single key menus/printer select/special commands/ comprehensive manual.

FUTURA 68000 PC — fully QL compatible — the machine of the year from Tony Tebby and Sandy Technology.

—HARDWARE—

SINCLAIR QL 128K		120.00
SINCLAIR QL 640K		199.00
THRU-CON RAM CARD 512K		96.00
SUPERDISK INTERFACE		88.00
SUPERQBOARD	0K RAM	120.00
	256K RAM	199.00
	512K RAM	215.00
SQB UPGRADE	0-256K	84.00
	0-512K	119.00
	256-512K	40.00
SQB SUPERMOUSE UPGRADE		87.00
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QEP EPROM CARTRIDGE	5.99
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NEW MICRODRIVE CART LOOSE/10	16.65
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QL SPARES/FAST REPAIRS	

—SOFTWARE—

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QPLUS+	14.95
QROM DISASSEMBLY AND MANUAL	35.00

SUPERBOARD — *The most sophisticated peripheral for the QL: fast RAM: 5.25″/3.5″ multi-standard disk interface: parallel printer port: spooler: ramdisks: disk management software: full Supertoolkit II from Tony Tebby: extensive manual: all on one small plug-in card.*

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Export enquiries welcome

NEWSFLASH

Sandy QXT640 upgrade and keyboard kit:
This super DIY kit is now supplied by:
BVBA DE BONDT ELECTRONICS — L. VAN HOEYMISSENSTRAAT 50
2910 MALDEREN-LONDERZEEL — BELGIUM — TEL. (01032) 52-33-16-56

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ISSN 0268067X

Back issues are available from the publisher price £1.50 U.K. £3 Overseas. Please telephone 01 222 9090 to check availability.

Published by Focus Magazines Ltd, London

Distributed by Quadrant Publishing Services, Sutton.

Subscription information from: Quadrant Subscription Services, Oakfield House, Perrymount Road, Haywards Heath, West Sussex 0444 459188 (£15 U.K. £30. Europe. £45 rest of the world)

Please allow 5 weeks from date of order to receipt of first subscription copy

Typesetting and make-up by Cradley Print PLC, England.

Printing by Cradley Print plc, England.

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NEXT MONTH

Keyboards compilers and code

We have finally managed to get our hands on some new QL keyboards which will be reviewed in the March issue. The new Digital Precision Compiler, Turbo, is undergoing our usual thorough test treatment and James Lucy will be giving his verdict.

Marcus Jeffery begins a new series showing how to write machine code extensions to SuperBasic, including listings anyone can type-in and use.

ULTRASOFT

UTILITIES FOR THE SERIOUS USER

TOOLBOX II (v1.20)

A serious self-stipulating backup utility using only superbasic extensions. Make exact microdrive format copies. Clone any file to any device, clone between devices and even clone on single floppy drives. SAFE, SURE, CERTAIN, PRECISE FAST FILE HANDLING for those much needed backups in a user friendly packet. Comes with the Ultrasoft standard and dynamic ramdiscs (ULTRADISK); **ultradisk can reside in the QL at the same time as a Standard Ramdisc and interact with the Standard Ramdisc.** Real multitasking call-up clocks, memory cut-off (lets the QL behave like a 128k QL) and a fully fledged diskmonitor to rescue those corrupted disks. You cannot afford to be without this package if you work with your QL. Full documentation.

Features: Backup Tools, Standard & Dynamic Ramdiscs, **Dynamic Ramdisc can now interact with a Standard Ramdisk,** Real Background Routine Clocks, Diskmonitor and Memory Cut-Off. DM49.00 £14.95

QKICK (v2.5)

'An amazing programme', MANY VERY GOOD PROGRAMMERS SAID IT WAS IMPOSSIBLE TO WRITE FOR THE QL. Qkick is the programme for the user who needs to work, whether he is a businessman, engineer or programmer. A fully multitasking programme running in interrupt 7 as a call-up background routine. Complete Desk-Top facilities including a notepad, appointment diary and database. Save memory, load memory, save screens for photo shots, alter job priorities and much more. Ideal to use e.g. while working in any other programme just enter QKICK without leaving the current programme, make some notes or look up a phone number or do some desk-top work and return into the programme where you stopped. THIS IS NOT A FRONT-END PROGRAMME. The database is user definable and has a transfer routine to transfer data or addresses into the current programme — e.g. while working in quill just look up an address and transfer it into Quill with no problem or complicated techniques. Customise Qkick to suit your needs. To save your monitor there is an automatic screen switch-off routine. Fully documented.

Features: Too many to describe.

Just let QKICK run in the background and you will use it with pleasure. Once you have used QKICK you will wonder how you ever worked without it. DM84.95 £24.95

QMASTER

THE DATABASE FOR THE QL. Driven by pull-down and pop-up menus. User defined variables. VERY EASY AND SAFE TO USE. SEND OR RING FOR A DEMO CARTRIDGE. If you need to use a user friendly database then this will suit your needs and leave you database-headache free at the end of a database day. DM159.95 £49.95

GRAPHIC CONSTRUCTION KIT (v1.35)

Now you can write your own customised graphics programme in just a few K of BASIC. A set of SuperBASIC extensions that allow you to really design the programme that suits your needs and not you having to suit your needs to the programme. Not only with rubber banding, circles etc., but you can load Spectrum screens directly and transform them to QL format. Use up to 16 screen banks at any one time, zoom with the variozoom, blend screens from left to right, mirror vertically, real scrolling off-screen and .... Comes with a screen compressor, a BASIC and a compiled programme example. Full documentation. DM49.00 £14.95

NEW RELEASES

J.A.M. Job Application Manager

J.A.M. is a front-end desk top and job manager programme using an icon environment. J.A.M. has its own internal dynamic ramdisc which does not need to be formatted. J.A.M. has its own job scheduler, **you can multitask the PSION suite (Quill etc.) without any additional software.** Notepad and job controls are standard. Customise your own JAM to suit your requirements. Mouse compatible.

Features: Icon Environment, System Internal Dynamic Ramdisc, Desk-Top Functions, Job Managers, the Psion suite can be multitasked without additional software. DM59.00 £19.95

MANDELBROT MAGIC

Discover the beauty of fractals by using this programme. Mandelbrot Magic runs as a job, in other words letting you work on with your QL while the programme calculates. Mandelbrot Magic is not only job but is also extremely fast, using fixed point evaluation from about 4 minutes or with floating point evaluation from about two hours. Full documentation.

Features: Save and Load Data, Save and Load Screens, Full Screen Evaluation and Determination, Runs as Job, Extremely Fast. DM49.00 £14.95

GAMES

FULL HOUSE

Reviewed in *QL World* 11/86 — 'it is good fun to play, worryingly' addictive. Superb colour graphics. You need nerves of steel to play. A fruit machine poker game completely identical to many machines found in German pubs. DM39.90 £12.95

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Main Distributor : **Hardware & Software Systems, Maximilian Str. 42a, 4400 Münster, West Germany. Tel: 0251 271653**

UK Distributor : **Eidersoft, Hall Farm, North Ockenden, Upminster, Essex. Tel: 0708 851099**

Belgium
Luxemburg
Netherlands : **Simsoft, Guy Delforge, Jan Hammineckerstraat 39, 2689 Mariekerke-Bornem, Belgium. Tel: 052 335910**

QL SCENE

Chatting up the editor

The many Sinclair QL World readers who regularly hook-up to Micronet 800, the on-line micro computing magazine on Prestel, had more than they bargained for earlier this month.

Sinclair QL World editor Ken McMahon was invited to the Micronet Celebrity Chatline — a little like the microcomputer equivalent of Wogan — but with questions from the audience. For an abridged version of the interview turn to page 39.

Belgian connection

Sandy PCP has handed over production of its QXT-640 QL upgrade kit to a Belgian electronics company. BVDA De Bondt Electronics has taken over production and distribution of the upgrade, estimated to be selling at the rate of 70 units per month.

A Sandy spokesman told *Sinclair QL World* that the company did not have the capacity to deal with orders, although Sandy is still producing the interface hardware and printed circuit boards for the machines.

A likely explanation is that Sandy is diverting all its resources into the Futura — the 68000-based QL-compatible machine designed by Tony Tebby. Despite claims by the company that the machine would be available before Christmas, it is unlikely to make an appearance before the end of February.

Sandy is also busy releasing a number of new QL products. The mouse, which is at the moment available only in the QXTT640 version, will soon be available for the standard QL. Another recent addition to the Sandy hardware range is a new disc interface and parallel printer port. The new board is a cut-down, cut-price version of the now famous Super-Q-Board. It has no additional RAM and a subset of the commands available on the Tebby-designed Super Toolkit II. Details of the interface and other Sandy products are available from Sandy PCP, Unit 33, Murdoch Road, Bedford, MK41 7PQ. Tel: 0234 219814.

SPEM photofinish

While the world holds its breath waiting for the new video digitiser from Pyramide, Italian company SPEM has beaten them to it. The SPEM digitiser plugs into the QL ROM socket and will work on a standard machine, though some memory expansion is recommended.

Recorded images can be manipulated on-screen by means of three slider controls which alter the level of red, blue and green in the picture. Screens can be either saved to Microdrive or dumped to a dot matrix printer.

The SPEM digitiser will work with most good video cameras and can also take images from a video recorder. As yet no price details are available but further information can be obtained from Sandy PCP on 0234 219814.

A sample image from SPEM digitizer.

More ROM for your money

QL owners with more ROMs than holes to put them in can thank TK Computerware for an extremely useful solution to the problem. The company has produced a ROM expansion which allows simultaneous connection of up to four 16K ROMs.

The board, which is manufactured by German company QFlash, plugs into the QL expansion port and is software-controlled, allowing switching between the chips without the necessity to turn off the machine. Memory expansion and disc interface boards can be plugged into a through-connector.

The ROM expansion costs £68 and is available from TK Computerware, Stone Street, North Stanford, Ashford, Kent TN15 6DF. Tel: 0303 812801.

Whose JAM?

A strange thing happened recently at the offices of Utility File author Ron Massey. He received an interesting package through the post which, after cursory examination, he decided was a review copy of front-end software for the QL.

The package is called JAM and has some very useful Microdrive and disc filing utilities. In addition, it has a few other features not to be found on similar packages such as ICE and GDesk.

It looks to be a very interesting package; there is, however, one rather major problem. The sender of the software omitted to mention their name and no contact address or telephone number was supplied.

If the anonymous software house would like to contact us and tell who it is, we might be able to review it.

STRONG COMPUTER SYSTEMS

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Complete with Communications Software for Prestel Etc.
128K QL Computer ..... £149.00 640K QL Computer £259.00
Special Offer: Silver Reed plotter with Talent Technikit only £199.00
Special offer: Psion set of 2.3 software only £9.95
QL Service Manual ..... £ 19.95
Quill Easel Archive & Easel on the Sinclair QL only £3.00
Metacomco Assembler ..... £ 24.95

PRINTER PRICES INCLUDE MIRACLE SYSTEMS INTERFACE

CITIZEN 120D	£209.00
SEIKOSHA SP1000A	£219.00
MP 165 165CPS TRF	£239.00
CANON PW1080	£289.00
KAGA TAXAN KP910	£419.00
QUEN DATA DAISYWHEEL	£199.00
2000 Sheets Fanfold paper Micro Perf	£ 19.00
2000 Sheets Fanfold Paper (supplied with printer)	£ 16.00
MIRACLE SYSTEMS PARALELL INTERFACE	£ 20.00

ACCESSORIES

CLEANING KIT IN CARRYING CASE	£ 27.00
3250 WATT MAINS FILTER	£ 36.00
MIRACLE SYSTEMS MODAPTOR	£ 36.00
MICROSTICK JOYSTICK WITH ADAPTOR	£ 16.00
20 CARTRIDGES WITH TRANSFORM BOX	£ 40.00
10 CARTRIDGES WITH TRANSFORM BOX	£ 23.00
4 Microdrive Cartridges	£ 8.00
Joystick Adaptor	£ 5.00
Serial Printer Cable	£ 8.00
Transform box	£ 5.00
Para Cable for Memodisk	£10.00
10 DS/DD 5.25" Disks	£19.00

MONITORS (Cables Included)

Microvitic Cub 1451/DQ3 Colour	£249.00
Microvitic Cub 1451/DQT3 with Swivel Stand	£269.00
Swivel Stand for Microvitic	£ 25.00
Phillips BM7502 20MHZ Green (RECOMMENDED FOR THE QL)	£ 99.00

RIBBONS

BROTHER M1009	£ 5.50	MT80 or Shinwa	£ 6.00
QUEN DATA	£ 6.00	SP1000A (Sinclair)	£ 7.50
TAXAN/CANNON	£ 8.00	EPSON RX/MX/FX	£ 6.50
EPSON LX80	£ 5.00	CITIZEN 120D	£ 6.50

DISK & RAM UPGRADES

MEMODISK includes Disk Interface + 512K RAM + Paraport + Toolkit EPROM with Multitasking, Windows, Icons RAM disk, Wild Card etc. £199.00

Above with NEC DUAL DRIVES £399.00
Miracle Systems 512K EXPANDERAM £119.00
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SPECIAL OFFER: 20 3.5" disks + free storage box for 40 disks ..... £ 58.00

SOFTWARE

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PCB DESIGNER 2	£ 89.00
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CONCEPT 3D CAD	£ 34.00
RUBICON VIEWPOINT	£ 24.95
DIGITAL EYE Q	£ 24.00
QDRAW	£ 14.95
QL PAINT	£ 15.95
SIGN DESIGNER	£ 19.00
FRONT PAGE	£ 24.00
PRO ASTROLOGER CART/DISK	£ 49.00
PRO ASTROLOGER + ASTRONOMER	£ 59.00
THE INVESTMENT MONITOR	£ 19.95

UTILITIES

TOOLKIT II ON EPROM	£ 34.00
DIGITAL MEDIA MANAGER	£ 35.00
TALENT CARTRIDGE DOCTOR	£ 13.00
QMON MONITOR/DEBUGGER	£ 18.00
TURBO TOOLKIT	£ 24.00
QFLASH RAMDISK + TOOLKIT	£ 19.00
BETTER BASIC EXPERT SYSTEM	£ 29.00
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EIDERSOFT ICE ROM + CHOICE	£ 39.00
EIDERSOFT ICE TOOLKIT	£ 10.00
EIDERSOFT ICE ARTICE	£ 13.00
EIDERSOFT ICE CHOICE	£ 15.00
EIDERSOFT ICE EPROM	£ 24.00
EIDERSOFT QSPELL DISK	£ 23.00
EIDERSOFT QSPELL CART	£ 20.00
TALENT TECHNIKIT	£ 24.00
TALENT QIMP	£ 39.00
TALENT BASIC-ALLY	£ 29.00
RAM DISK & PRINT SPOOLER	£ 9.00
TALENT SIDEWAYS	£ 19.00
TALENT QL TOOLSET	£ 19.00
SECTOR TASKMASTER	£ 25.00

LANGUAGES

GST MACRO ASSMBLER	£ 34.00
METACOMCO ASSEMBLER	£ 29.00
METACOMCO BCPL	£ 49.00
METACOMCO LISP	£ 49.00
METACOMCO PASCAL	£ 69.00
METACOMCO 'C'	£ 79.00
METACOMCO APL	£ 89.00
PRO FORTRAN 77	£ 89.00
PRO PASCAL	£ 89.00
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ADVENTURE WRITING SYSTEM	£ 22.00
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DIGITAL BLOCKLANDS	£ 9.95
DIGITAL DROIDZONE	£ 9.95
AMBITION	£ 29.95
PYRAMIDE VROOM	£ 14.95
PYRAMIDE WANDERER 3D	£ 19.95
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PYRAMIDE NUCLEON	£ 18.95
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KNIGHT FLIGHT	£ 12.95
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EIDERSOFT BJ 3D	£ 9.95
EIDERSOFT BJ RETURNS	£ 9.95
EIDERSOFT KARATE	£ 13.95
EIDERSOFT CITADELL	£ 8.95
SECTOR TOUCH TYPIST	£ 12.00
DS. ENTERPRISES QL MULTITASK	£ 14.95

ALL PRICES INCLUDE VAT & CARRIAGE

★ QL SOFTWARE ★

SPECIAL CHRISTMAS OFFERS

★ CHARACTER TOOLKIT £5 ★

This package contains all you need to create and use your own character sets on your QL. It also contains routines that allow you to print characters of an infinitely variable size anywhere on the screen. To help you design your characters sets we have even included a special designer program which makes it even easier.

★ ICON TOOLKIT £5 ★

This package contains all you need to turn your QL into an Icon controlled super micro – takes the tedium out of typing; unlike some systems, ours is fully programmable. You can program the Icons to do anything you like – you can of course redesign the Icons themselves and we have even included a special designer program to make the task that bit easier.

This toolkit also contains lots of new graphics commands, all of which have the ability to draw using user defined patterns, not just solid lines. There is even a new fill command that will fill any shape with any user defined pattern (features like these are normally only to be found in the most expensive of drawing programs). We even throw in a special pattern designer so that you can design your own new patterns at leisure.

There are also 2 Epson compatible screen dumps, a print spooler and an on screen notepad.

★ GAME TOOLKIT £5 ★

This toolkit contains everything you need to create fast animated arcade games on your QL. It also contains extra routines to allow you to produce multi-tasking tunes (like the ones found in all the best arcade games). You can have up to 32 sprites all of which can have up to 16 frames of animation. Collision detection is also provided and of course it goes without saying that our sprites are some of the fastest and smoothest around. A sprite designer is also included.

★ COMPLETE TOOLKIT £10 ★

All three toolkits on one cartridge offering a substantial saving – probably the best toolkit ever!!!

★ SOUND EXPERIMENTER £5 ★

This is probably one of the most original and interesting packages ever written for the QL. Using this package you can turn your QL into a sort of primitive digital synthesiser. The package actually allows you to draw sounds on your QL screen and then play them back either forwards or backwards in whole or in part, so if you're at all interested in sound synthesis or you just like making silly noises then this is the package for you, and there is also a special program included to help you get better aquainted with the super basic beep command (saves hours of messing about trying to find the sound you want).

★ BLOBZ £3 ★

THE RUBBERISED ASTEROIDS GAME – ADDICTIVE ARCADE ACTION

Send cheques or P.O.s to:

SMILING SOFTWARE

10 Fir Road, Marple, Stockport SK6 7QN (89)

QATS–QL Applications Traffic Supervisor (VERSION 2)

QATS is a utilities package and universal boot program designed to minimise your use of the keyboard by cutting down on all those unnecessary, boring keystrokes needed to execute jobs, copy and delete files and display directories. And it's quick to use because it's menu driven. For example, to start a PSION program you press two keys–one to give PSION menu and one to choose a program from that menu. When you quit the program you will return to QATS ready to run another PSION program or any of the easy-to-use QATS utilities. QATS stays in your QL all the time, always available. The comprehensive manual includes 22 step by step examples to get you started.

QATS allows you to:

- ★ set up menus to run your own jobs (EXEC'able programs only)
- ★ rearrange the supplied menus and add your own to suit your own style of working
- ★ fast copy files, selectively or not
- ★ delete files, selectively or not
- ★ control jobs running in the machine
- ★ log the work done in a session
- ★ teach it your standard working methods (such as what backups you do at the start and/or finish of each session) and instigate the routines for automatic completion
- ★ multi-task your own programs (if EXEC'able) in any combinations subject to the size of your QL
- ★ start PSION jobs (expanded memory QL's only)
- ★ display paged directories showing filenames in alphabetical order with file sizes
- ★ use the sophisticated wild card file facility–essential for managing floppy and hard disks
- ★ swap PSION printer drivers speedily

OUTPUT CONTROL, the first of a series of extensions planned for running under QATS, is a printing package which will:

- ★ print in the background while you do other work
- ★ divide unformatted files into pages with headings
- ★ print on continuous stationery or single sheets
- ★ print labels, mailing lists and HEX dumps

Output Control also includes a greatly extended printer driver.

QATS EPROM is also available. If the QATS EPROM is in the ROM slot at the back of your QL then you will save 16K of memory. However, if you want to use the ROM slot for something else QATS will automatically allow for its missing EPROM and load from backing storage.

QL is a trademark of Sinclair Research Ltd. PSION is a trade mark of PSION Ltd.

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QL V Amstrad

When the QL was launched in 1984, it cost £399 and represented a significant advance in technology. The Amstrad PC1512, launched in September 1986, also cost £399 and was practically a step backward in technology. Given the totally different philosophies adopted by Amstrad and Sinclair, how do the two micros compare? James Lucy discovers.

When my long-awaited mail order QL finally arrived, the excitement was tempered by surprise at the smallness of the brown box — £450 for that? Inside was the QL, a large manual, a box of Psion software, and a consolation printer cable. The same package is now available for £100 from Dixons, which seems a more sensible price.

On the other hand, if your Access limit can stand about £500, you can stagger away with two large boxes containing the base model Amstrad. Opening the boxes reveals a monochrome monitor, an IBM-style keyboard, a box to stand the monitor on which also happens to contain the main circuit board and disc drive and, lurking in a dark corner of the packaging, a rather peculiar-looking mouse.

There are also four discs containing two operating systems, the GEM 'friendly front-end', GEM Paint, Locomotive Basic2, four batteries for the maintained RAM and a 500-page manual. In other words, the initial impression of value for money is very good, but an equivalent for the Psion suite is conspicuous by its absence.

The heart

Most readers will need little introduction to QL hardware. The heart of the machine is the 68008 processor, which has 32-bit internal registers (8 which are filled) bits at a time through the narrow 8-bit data bus. A second processor looks after keyboard scanning and other housekeeping jobs. The 128K of RAM is implemented in slightly old-fashioned 64K-bit RAM chips, and two mass storage devices in the form of Microdrives are provided.

Rudimentary network hardware is included, and video output is RGB, composite video or UHF, suitable for most monitors and television sets. There are two serial ports and a slot for add-on ROM but no parallel port. A single expansion slot providing unbuffered access to all the 68008 signals and a rather crude keyboard complete the hardware picture.

The Amstrad PC is very different. The 8086 processor running at 8MHz has 16-bit access to the memory and 8-bit to the outside world, and a few Amstrad custom chips allow the machine to emulate the IBM. Three IBM-style expansion slots are provided which will accept most types of add-on including hard cards, but excluding the so-called Enhanced Graphics Adapter. A hard card is a device guaranteed to make a QL owner envious as it allows a 20MB Winchester to be added for about £400, half the price of a QL hard disc.

The Amstrad has 512K RAM implemented in 256Kbit chips, with sockets for an extra 128K if required. The keyboard incorporates a numeric keypad, 10 function keys and various special-purpose keys like Page-Up and Page-Down, but is perhaps a little light in operation for touch typists. Five-and-a-quarter inch discs are retained in the interests of IBM compatibility despite the superiority of three-and-a-half inch drives; a mere 360K from such a large area of magnetic material seems rather poor.

The monitor is monochrome on the base model and gives a reasonable picture but the colour version does not begin to compare to a Sinclair Vision monitor. Swapping monitors is a problem because the monitor contains the power supply for the computer and the RGB signals are different from those on the QL. The mouse, a serial port, a parallel port and a potentially noisy speaker with volume control complete the generous Amstrad hardware.

The Amstrad seems to be a better

machine but it has only 16K of ROM. That means that the operating system must be loaded from disc each time the computer is switched on, which is tedious and, depending on the system chosen, can consume significant sections of the available RAM. Similarly, Basic is not available instantly as on the QL. Providing, however, the application is not too large, it is possible to produce turnkey discs which contain all the necessary files to run from start-up. The Amstrad also lacks anything to compare to QDOS, the QL multi-tasking system which makes writing QL machine code so interesting.

Many QL users will have bought the machine for the four programs from Psion. They have their shortcomings, particularly on a 128K QL without discs, but nevertheless represent an astonishing bargain bearing in mind the current QL price. Amstrad owners will have to dig yet deeper into their pockets to get any applications software other than GEM Paint, which is impressive and fun, but completely useless. You get MS-DOS, GEM and DOS Plus which together allow the Amstrad to run a very wide variety of commercial software.

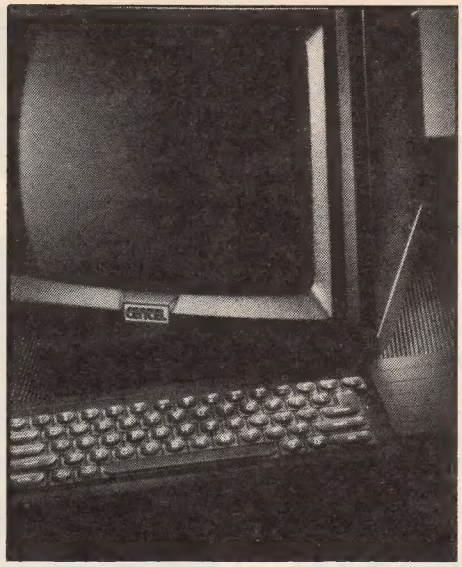
Structure

QL SuperBasic has been well-documented in numerous books and in *Sinclair QL World,* so its general features will not be repeated. It is possible to write clear, self-documenting code of a type which will delight the advocates of structured, top-down programming. The only serious omission is file error trapping, half-heartedly implemented on JS version ROMs, but available through one of the many reasonably-priced add-on toolkits.

SuperBasic seems to have a structure for every occasion but is painfully slow. Some amelioration can be sought in SuperBasic compilers but the fundamental problem remains.

The Amstrad Locomotive Basic2 is a new product and a very interesting one. It runs under the graphics environment GEM, which means that all the window control, the use of the mouse and advanced output facilities provided by GEM are available to it. Its strongest feature in relation to SuperBasic is probably its enormous range of graphics commands. A wide variety of line widths and styles, fill patterns, colours, font sizes and font types are available.

The most unusual feature of Basic2 is its lack of line numbers, although labels can be used instead. Its weakest feature is its lack of procedures; you can GOSUB a label but parameter passing is not supported. It is amaz-

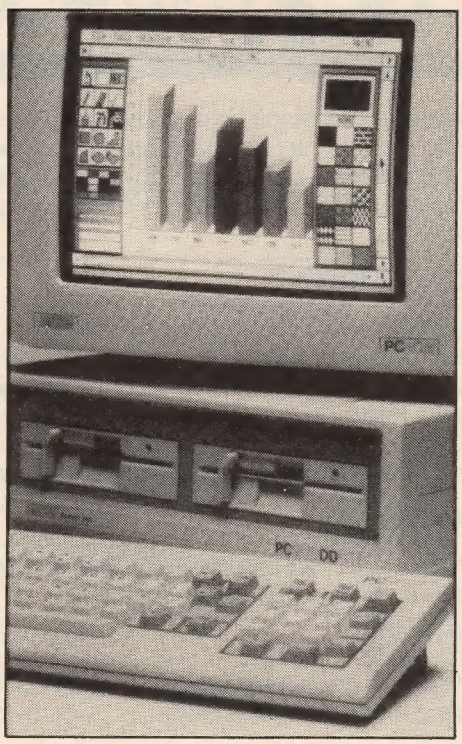


ingly fast but there is one very big proviso, that is GEM.

If Basic2 is required to write to a graphics screen, which it does via GEM, the results can take a surprisingly long time to appear. GEM is very slow in scrolling screens, for instance. GEM also has a rather odd 640 × 200 pixel screen, the coarse vertical resolution causing pronounced 'staircasing' on slanting lines. Further problems arise — Basic2 is given only a cursory mention in the manual, so you must buy the Basic2 book which costs £10. The hackers among you have no peeks or pokes to play with, which means no direct access to the machine memory.

More programs

The Amstrad can scarcely go wrong so far as software is concerned since there are probably more programs for the IBM than for all other micros put together. There is a current trend, likely to be short-lived, of producing 'hobbled' versions of best-selling software specifically for the Amstrad. It will not be long before the proper versions are forced down in price but, even so, £50 might become a typical price for a word processor or database. The QL has been around long enough now for most software requirements to be met and at reasonable prices but there are still some anomalies. It is annoying to have to pay £80 for Lattice C on the QL when the excellent Zorland C on the Amstrad costs £30.



Let us suppose the average buyer considers a disc drive and extra memory essential for the QL and requires word processing, database and spreadsheet for the Amstrad. This is how the prices add up:

Sinclair QL inc.	£100
Archive	
Abacus	
Quill	
Easel	
Mono monitor	£75
Technology Research 128K RAM, 3.5 disc parallel i/f	£190
QL total:	£365

Amstrad PC1512	£517
Wordstar 1512	£70
VP Info (database)	£99
VP Planner (spreadsh.)	£99
Amstrad total:	£785

What it all boils down to is that the QL remains an attractive purchase for small business use, providing that you are happy with the Psion programs. If you are interested in machine code, 68000 seems the most lively area at the moment and if you like programming in Basic, SuperBasic will please the computer science teacher more than Locomotive Basic2. If you want to network machines, or you want to move your machine and use a hotel room TV as a display, you must have the QL.

Temperament

On the other hand, the Amstrad gives access to the vast world of IBM software and add-ons and is a very fast machine, both in Basic and when running compiled code. The stories about over-heating are in my experience just nonsense, and the Amstrad has shown no temperament whatsoever, unlike my QL. Locomotive Basic2 is a very interesting program with some powerful features and amazing speed. Attractive though the Amstrad is, with this micro more than most, the price in the shop window is just the start.

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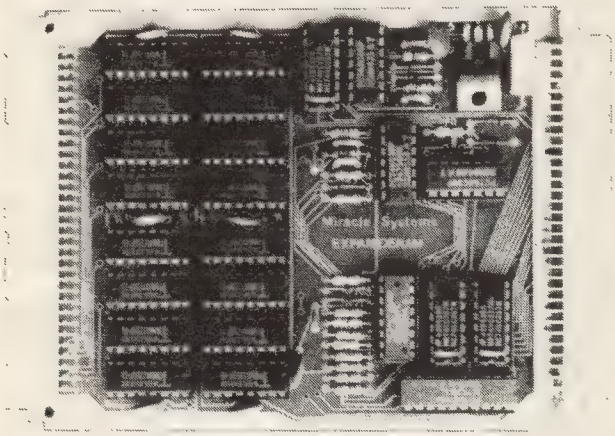

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Precision point

Dene Fisher's letter in the December issue correctly identifies the most useful products for the QL as being Turbo and Supercharge, both written by Digital Precision.

It is absurd, however, to compare the production costs of a program like Supercharge with those of Matchpoint. The former has taken 5,000 hours of programmer time. Further, the programmers are of the very highest calibre — people who would command £40-£50 per hour on the open market.

Without wishing to run down *Matchpoint* — a fine game of its type — the development time on such software is a few weeks at most for a reasonably competent coder. Comparing Turbo — a further 3,000 man hours in addition to Supercharge — Matchpoint hence is ridiculous.

A word in conclusion. The Microsoft Basic compiler compiles MS Basic; a trivial subset of SuperBasic having no procedures, functions, linking, pipes, multi-tasking, optimisation or virtual arrays costs more than £250 — more than four times the cost of our best-selling compiler.

Digital Precision loves the QL but we may be forced to raise our prices in the near future. Our products will still be very, very cheap at the price.

Freddy Vaccha,
Managing director,
Digital Precision.

Oh Brother

Could you please send me a copy of the Brother HR5 printer set-up codes for the QL as my father has the same problem as the person who wrote to your magazine — December issue. May I also congratulate you on a superb magazine which seems to cover many facets of the QL for novices and professionals alike?

Like many before me I am amazed what this little machine can do and, when compared to what I see in the market, it still compares very favourably. People rave about the Amstrad PC 1512 which is 'such good value' at £399 plus VAT but is it? I bought my QL early in 1985 at the full price of £499 and I still do not see a machine which matches it for performance and usability for a first-time user. There are certain rules you have to get used to with Microdrives but at least you can plug in and go with the bundled Psion software. I would love to see a first-time user with a PC 1512. They would never forget the manuals — that is certain.

What is the cost of a QL? £140 in Dixons for the basic machine, £120 for memory expansion — 512K — and £90 for a monochrome monitor, a total of about £350.

It is true to say the PC 1512 has a disc drive but that is just it — a disc drive which can make back-ups slightly laborious. Also there is the important fact that to match the free software you get with the QL you would have to spend more than £200. Even then the level of interface between the packages would be difficult to beat.

I am biased but since January, 1986 I found that it does not take much to enthuse people about the black magic box. At work we now have four 640K QLs working continuously, two talk to each other via the network and one has three disc drives — two 3½in., one 5¼in. It all started from a demonstration I made to the directors on my 128K machine. Not one of the five has ever broken down, although we have had our moments. Also four have been bought by employees since, one being our engineering operations director.

Using the Archive runtime module I am able to produce invoice schedules for the company for cashflow purposes, time recording against more than 400 projects each week, with exception reports with departmental budget and variation control. The company is 80 strong and is a wholly-owned subsidary of a large oil company, which goes to show there was a place for the QL in business — it was just never exploited.

If it had been marketed properly one never knows how it could have gone. I would never part with mine. Keep up the good work.

K. P. Wookey,
Twickenham,
Middlesex.

Editor's reply: As we had so many requests for the HR5 printer driver we decided the simplest thing to do was reproduce it here. If anyone else has overcome problems getting a particular printer to work with the QL, write and let us know.

Parity	NONE
Baud Rate	9600
Lines/Page	66
Characters/Line	80
Continuous Forms	Optional
End of Line Code	CR, LF
End of Page Code	FF
Preamble Code	NONE
Postamble Code	NONE
Emphasized ON	Esc, "E
Emphasized OFF	Esc, "F
Underline ON	Esc, "-,"1
Underline OFF	Esc,"-,"0
Subscript ON	Esc."S."1
Subscript OFF	Esc,"T
Superscript ON	Esc,"S,"
Superscript OFF	Esc,"T
Translate 1	£, #
Translate 2	Optional

Parameters for the Brother HR5 thermal dot matrix printer.

Radio rallies

I read with avid interest the letter in the December issue of the "fair gamble" letter from S A Hall of Brighton, about Medic system cartridges on sale at £30. What are radio rallies? Do they visit Wales? Where can I get a Medic system cartridge?

E. A. Duncan-Dunlop,
Bridgend,
Mid-Glamorgan.

The best place to pick up a Medic cartridge will undoubtedly be a computer fair. As Medic went out of business about a year and a half ago I do not know if you can obtain the cartridges any other way.

CHANNEL

More Medic

Regarding the letter from S. A. Hall in the December edition, I am also a radio amateur and also bought a Medic system cartridge from the Telford rally in September. I managed to find a 512K version and had the same need to re-route the power take-off from the QL. I also found that removing the QL PSU from its case did help stop it overheating.

The interface has been configured to use the 'old-style' drives apparently, and if you should wish to use the new third height NEC or Cumana drives, you will have problems with timing. The Medic firmware does not give the drive sufficient time to reach full rotational speed and returns 'Not found'. I do not know which other drives do the same but I thought it just as well to have the EPROM seen to anyway.

The PCML/Sandy all have the longer start-up time and have no problems and I cannot see why the interface should hiccup with the older drives.

The EPROM was re-blown by Compware in Crewe and at the time cost £10 if you sent your old chip.

A photocopy of the Medic manual was also provided and £3 was charged to cover photocopying costs and P&P. The interface now works excellently with the NEC drive and is as fast as the competition. The only problem I have is that if you re-set or start-up the QL without a disc in the drive, once it searches on autoboot the drive does not stop and the only way to stop it is to do an FLP which does not exist i.e. FLP_4.

To overcome this, I switch on the drive first, insert a disc, then plug in the QL. It does not matter whether there is anything on the disc or not — there just has to be one present. This seems to be a bug in the Medic operating system and not associated with using the new drives but I could be wrong.

A. Tidswell,
Holywell,
Clwyd.

Quick tip

Here is a quick tip I discovered when I disassembled the *Breakout* game which is on the free games cartridge with most QLs. Just break into the program when it is asking for "1 or 2 players" by pressing control-space, and then enter POKE V+42,n where n is the number of balls you require up to 255.

Could anyone tell me how to create graphics for use in SuperBasic programs without using POINT, LINE, i.e., like ZX-Spectrum user-defined graphics?

Chris Hopkin,
Nottingham.

Editor's reply: We devoted a whole feature to graphics in the July issue. It includes a complete suite of programs to help you design your own characters.

Plea

I have enjoyed the benefits of Quill and Abacus programs supplied with the QL and satisfactorily printed-out the results of my labours, using the serial 8056 printer, also supplied.

I am now venturing into writing SuperBasic programs. My plea for help is how do I print-out hard copies of my listings? My previous machine was the humble ZX-81, where the LLIST or LPRINT commands did all the work.

John Franc,
Wokingham,
Berkshire.

Editor's reply: It is reasonably straightforward — when you know how. Just type-in the following two lines:
Open #6,ser1 [ENTER]
list #6 [ENTER]

Endorsement

The suggestion of E Palfrey is something which I heartily endorse. Further to his comments, I have something to add. I am now trying to learn Pascal — or at least thinking of it. After much browsing in the library, I saw four books at various times which dealt with the subject. None was suitable for beginners.

In your articles on languages, it would be helpful if a list of books on one particular language were reviewed at the same time, together with publishers' names. We would like to know if that book was for a beginner or an extension for further study.

A. Petrie,
Gorleston,
Norfolk.

Drive dilemma

I use my QL predominantly for word processing. I find the Quill package extremely easy to operate, easier than many other systems with which I have had dealings. Although I realise there is a cloud over the future of the QL, I would prefer to go on using it so long as reasonably practicable.

I want to ask advice on the way Quill works with a long text is to create a temporary program on the second drive and then move text backwards and forwards between that and the screen.

That can become slow. I have seen advertisements in *QL World* for various disc systems including or not including RAM expansions. What I should like to know is whether if the main use to which one puts the QL is word processing, but should like to be able to handle larger texts more easily and reliably, whether there is any advantage in having a RAM expansion rather than a double drive. A double drive is essential, since otherwise one cannot back-up discs and there is nowhere for the buffer program to go.

Incidentally, could you also please confirm that with a double drive, I shall be able to handle larger texts with the buffer on the second disc, since otherwise there would not be much point in spending the money on one? What are the advantages and disadvantages of the two sizes of discs? Would there be any way of putting all four Psion programmes on the same disc with a loading menu of some kind?

If there are advantages in having a RAM expansion, could you please let me know what they are, since one sees these things advertised without being given much idea what they do.

With the cloud which hangs over the future of the QL, could you please let me know whether your excellent magazine is intending to continue publication?

J. D. A. Brooke-Taylor,
Bristol.

Editor's reply: The answer to your last question is a very definite yes. Regarding disc drives you seem to be a little confused. Basically, extra RAM is always useful and will allow you to create longer documents. Most disc interfaces provide a certain amount of expansion on-board.

A dual drive is handy as it allows you to keep your applications software in one drive, leaving the other free for data files. Backing-up is also easier. If cost is a factor the only major disadvantage with a single drive is the inconvenience.

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Sinclair QDOS Companion

The QDOS Companion, by Andrew Pennell, one of the most prolific authors on the QL, is essential reading if you are interested in programming the QL in machine code. It describes all the features of QDOS, and gives details of all the TRAPs, and Vector calls. It includes details on how to access the keyboard, screen, serial ports etc. from machine code, how to communicate with the 8049 co-processor, and how to write multi-tasking programmes and lots more. £6.95

QL Service Manual

The QL Service Manual is the book issued by Sinclair Research to QL Repair companies, and contains all you need to know about the QL Hardware. It has full circuit diagrams, including the Micro-drives, details on the various chips and their function, block diagrams, details on how to repair the QL, and the components used and lots more £19.95

Machine Code Programming on the Sinclair QL

This book is a guide to writing machine code using the 68008 processor in the QL. It starts with the very basics with a description of binary numbers, and finishes with details on how to link in machine code routines as new SuperBASIC keywords, and the creation of Jobs. Ideal for the beginner to QL Machine Code .£4.50

QL Games Compendium

This book by Tim Hartnell contains listings for over 20 QL games/leisure programmes including: Eliza (In which you QL can carry on a conversation with you), Othello, Magicians Maze, Detective Q, Stockbroker, Tryst with Mephistopheles, QL Racer. It also contains details on how the games work, and on how to write you own programmes for the QL £5.95

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Miracle Expanderams are compatible with Cumana disc systems, and cause some QL software to run up to 30% faster.

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MPC SOFTWARE, 72 Julian Road, West Bridgford, Nottingham NG2 5AN.
Tel: 0602-820106

SOFTWARE RELEASE

Look and Learn

Revisor is the first serious attempt at providing revision software for the serious student. Ron Massey puts it to the test.

The virtual non-existence of QL programs intended for educational applications is glaringly obvious. Considering the processing power of the machine, this is a rather amazing omission.

Justifiably described by its author as an indispensible educational aid, *Revisor* is a framework upon which can be built a specific study system applicable to your needs. Study material produced for use with Revisor may be organised using a number of formats which may be mixed according to individual requirements.

Five small demonstration files supplied with the program, French, French 2, physics, chemistry and quiz, are provided as samples of a few of the many windowing and structuring capabilities of Revisor.

At home

Quill users will feel at home with the customising capabilities of Revisor. By selecting Design, screen layout can be arranged according to individual study or revision requirements. Display modes may be selected and the BEEP facility, which responds to correct or incorrect answers, can be toggled on and off. Labels and associated keys for the input of answers offers alternative key entry requirements.

Other options allow you to edit, replay or print the contents of a file held in memory. A number of editing features enable you to customise size and positions of the question and answer windows; set paper and ink colours and alter existing, or insert new text into the current file. On-screen help is available during the editing process and selecting Keys will produce a screen display of the editing keys.

Combination

By setting the Editing facility to off, a special combination of key presses is required to re-access any of the current files directly. Selecting Replay will re-run all, a selected range of page numbers, or just the questions answered incorrectly. The answers to multiple-choice questions can be displayed on each page in random order to prevent the user having to memorise their on-screen positions.

Users have the option of selecting between two and five answers to each multiple-choice question. An optional explanation window provides additional on-screen information related to each of the questions or, as illustrated by the quiz demo file, multiple-choice answers. Explanation pages may be interleaved with the question/answer pages for more detailed explanations.

Look and learn

A facility for aiding the memorising of screen pages verbatim is provided whereby the user can select sentences, paragraphs or a whole page of information for purposes of prompting. Printing options available to Revisor enable production of paper copies of files either in exam form or as a teacher's master crib sheet. Entering the print option, you are asked if you want the correct answers indicated and if the print copy is to include any explanations in the file. Consistent with the Revisor presentation format, input requires only single key presses.

The next stage of preparation is the device to which the file is to be sent and this can be any legitimate QL device, such as ser, par, or any drive system. Having opened a file, you can either specify the complete file, starting with page one or a range of pages to be printed. Each question is printed with its associated page number. If the option of having the pages presented in random order has been chosen, the presentation page number is printed, followed by the absolute file page number placed in brackets. Printed output can be formatted specially by outputting the file to a drive, adding the _lis suffix to its name and subsequently importing it into Quill.

In many ways, using Revisor is very much like working with a program combining the best features of Quill and a good text editor which, in addition, includes the facility for manipulating the text files produced with it in special ways.

Impressive

I like Revisor. There is something about some programs which, when viewed for the first time, evoke a feeling of impressed astonishment.

Whatever the cause of the sentiment, Revisor has it. By sheer weight of versatility, there are very few fields of endeavour where a correct response from the user is required in which Revisor will not find a viable use, whether for teachers preparing examination papers, or for students using their own material or that supplied by their mentors.

INFORMATION

Product: Revisor **Price:** £14.50
Source: Digitrix, Wishingtons, Porkellis, Helston, Cornwall TR13 0LB

Micro Anvika

220a Tottenham Court Road, London, W1P 9AF. Tel: (01) 636 2547
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BOOKMARKS

The return of Bookmarks reflects an upturn in the publishing fortunes of the QL. Marcus Jeffery looks at a range of budget QL titles from Bernard Babani.

Bernard Babani Publishing Ltd has earned a reputation for producing cheap, pocket-sized, guide books for electronics, radio and computer users. The Babani catalogue claims that offers "The finest value technical books available". *QL World* decided to put them to the test by looking at five QL-related books.

All the books looked at sell for less than £3, containing a maximum of about 100 pages. They are printed on fairly cheap paper, presumably to keep costs low.

TITLE: *An Introduction to Programming the Sinclair QL.*
AUTHORS: *R. A. & J. W. Penfold*
PRICE: *£1.95*

Written for the absolute beginner, this is designed as an easy and gentle introduction to SuperBasic, though after only 76 pages interfaces are considered, and discussion centres on baud rates and handshaking.

On reading the opening chapter, I was almost immediately assaulted by a FOR..NEXT loop. That is not to say that I disagree with its positioning in the text. I merely wondered why it had not been presented as a FOR..END FOR loop. After all, though NEXT can be used, it is really intended for premature return to the loop start. The QL User Guide describes it as the opposite of EXIT which is used to terminate loops. Nowhere in the entire book could I find the standard END FOR used.

TITLE: *An Introduction to 68000 Assembly Language*
AUTHORS: *R. A. & J. W. Penfold*
PRICE: *£2.95*

I will not go into too much detail about this book. It is almost an exact duplicate of the machine code book. The increased price is no doubt due to the addition of division, loops, and clearing memory routines at the end of the book. This time, of course, the routines are all in assembly code rather than poking values from SuperBasic. Another book to avoid.

Fortunately, these features are rare in the book. Though the example programs leave much to be desired, they at least work, having been printed directly from the original copy.

The book tries to cover too much ground in too little space. Further, the important points concerning new keywords tend to be embedded in text, rather than made clear. With the omission of an index, this makes the book virtually valueless. Though it would be possible for beginners to read it from cover to cover, and try the examples, they could not then use it for reference.

In conclusion, stick to the admittedly far from perfect Beginners section in the QL User Guide.

TITLE: *Into the QL Archive*
AUTHOR: *J. W. Penfold*
PRICE: *£2.50*

This was the penultimate book I read, and it came as a breath of fresh air. It is not an amazing book, but it tells the reader what he wants to know, from scratch, and in a logical structure, with no noticeable omissions.

Having said this, it contains very little information which you could not find in the QL User Guide and it will take you just as long to find the relevant piece of text.

TITLE: *An Introduction to QL Machine Code*
AUTHOR: *R. A. & J. W. Penfold*
PRICE: *£2.50*

This book must be the worst of the five. The cover states that no previous knowledge of machine code programming is assumed. Consequently, the authors can be forgiven for spending fully one-third of the book dealing with the basic principles of the processor, binary and hexadecimal number format.

The authors cannot, however, be excused for then spending the rest of the book dealing solely with addressing modes and the instruction set. The latter is dealt with in alphabetic order, which is satisfactory for a reference text but useless for a teaching aid. Finally, three eleven-line SuperBasic programs POKE values into memory (line by line) to show how two numbers can be added, subtracted and multiplied.

TITLE: *Counting on QL Abacus*
AUTHOR: *J. W. Penfold*
PRICE: *£2.50*

This is of about the same quality as the Archive book. It has been sensibly laid out, beginning with an explanation of a spreadsheet and its possible uses. Examples are used throughout to augment the text.

This is the only book which I might criticise for a lack of information. It contains all the essential information for the reader to start using a spreadsheet but does not explain fully the wide variety of uses to which spreadsheets can be put. This is not major, and could be viewed as being over-critical of the only Babani QL book which fulfils all its promises.

Conclusion

Despite the fact that all the books are by the same two authors, there is a variety in their quality. As with any product, you tend to get what you pay for, and I would find it extremely difficult to recommend any of these books over similar ones published by Hutchinson, Sunshine, or the Century Communications Psion program Blueprints.

I was under the impression with all the books that they had been trying to squeeze too much information into too little space. If this is the case, then the authors are not solely to blame for the lack of useful and organised information. Nevertheless, if this is the case, then the books should have instead tried to deal with more specific topics, in more detail. They should certainly not claim to be a definitive introduction for the absolute beginner.

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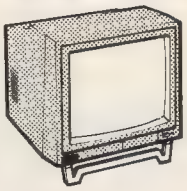

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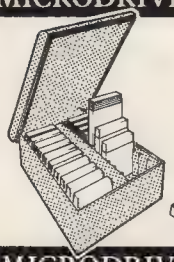

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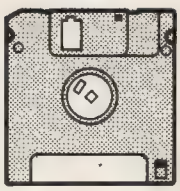

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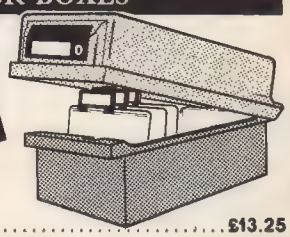

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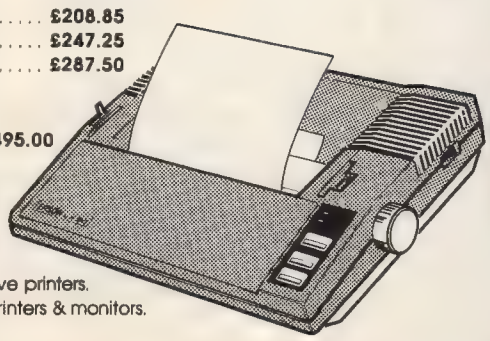

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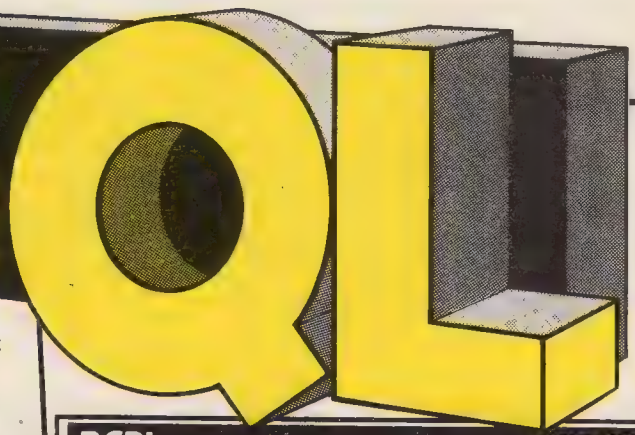

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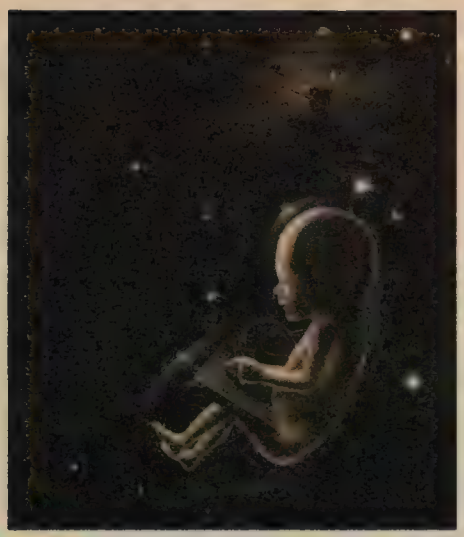


EDUCATION...

First lessons in teaching with the computer

There is probably a greater shortage of good educational software for the QL than for most other home micros. There are many reasons for this, but the fact remains that most people want to write their own educational software.

This series by Leslie Fahidy will help those in this position, examining both the educational principles and many of the programming concepts involved.

Writers of educational software face one problem the authors of other types of software do not. Not only do they need to have expert knowledge of the subject matter and a knowledge of programming, but they must also be aware of some educational principles.

There are some important principles which do not change whether you use the computer to learn or go to evening classes. There are some others, however, which are specifically applicable in the field of computer learning. The general principles of teaching would fill a book. The more specific points, which arise as a result of using a computer are numerous. We cannot incorporate all this into a series of articles but we will be able to pass sufficient information to enable you to write efficient educational programs.

There are three important keywords of which, when teaching anything to anybody, we must never lose sight. Structuring the lesson, obtaining feedback from the learner and evaluating the outcome.

We must ask ourselves the question what is it that we want the learner to learn? Listing one is included in this month's article and this question was answered through teaching percentages. We must, however, go a little further and ask some other relevant questions. What is the age and the expected standard of the learner? Do we want to teach the theoretical aspects of percentages, or are we satisfied if the user merely learns how to calculate answers to questions? Do we just want to show examples of how to do it, or is it necessary that the student should work through some examples?

Some questions on percentages can be easy, such as when the learner is required to calculate the given percentage of a number whereas other questions can be difficult. As an example, a retailer sells goods for £129.25. We know that a profit of 32% was made and that VAT was added at 15%. What was the wholesale price of the goods? No doubt, a question on percentages, but it is far more difficult to answer than the simple question of calculating the 12.5% of 123.

We are not advocating one or the other of these questions; they both are equally useful and necessary for a mastery of percentage calculations. The point we are arguing is that these questions, and numerous others, must be answered by the prospective educational software writer, before they sit in front of the QL and start entering code.

Special significance

Structure is, probably, the most important single element in an educational program. If you omit to obtain feedback from the learner or do not evaluate the answers properly, the student may still learn from the program. If structure is lacking the program has failed completely. This principle is equally important, whatever medium is used in the teaching process but with computer teaching it acquires special significance.

I am a teacher and must admit that my lectures are not always properly structured. I have enough experience, however, to re-structure my lesson on the spot. Even in a book one can, sometimes, get away with poor structure. It is always possible to re-write a chapter when inspiration is more readily available. Not to mention that the reader does not have to read the book in the order of the chapters.

A computer program is fixed. It will be run in the order in which the author intended it to run, and everything must be planned in detail beforehand.

There is an old saying in computing circles, according to which 5% of programmers are able to write programs without detailed planning beforehand. Unfortunately, the remaining 95%

think that they belong to this category.

Feedback is a two-way process. The users must be allowed to let us know how much they have learned, and be told their progress. On the face of it, that is all there is to know about feedback but feedback is a method of communication and must be mastered if we are to communicate effectively.

In computer teaching we communicate via the screen with its shape, format, colours and, of course, the words and expressions we choose. They must be correct for the age and ability of the group at whom the program is aimed. If we use 'big' words which the user cannot understand, or small characters which they cannot read, or if the screen is so cluttered with redundant information that the true message is difficult to find, we are not communicating effectively.

Extra care needed

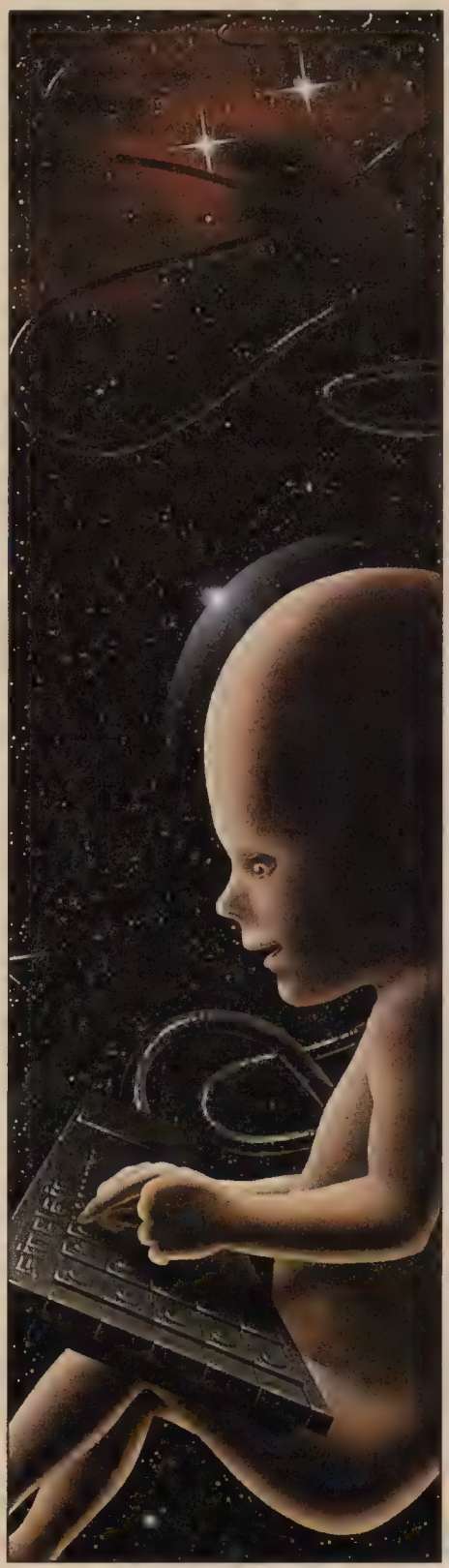
Extra care is needed when using the computer, compared to facing a class for a lesson. Face-to-face communication is usually easier. We can always adjust our methods, we can always use gestures and other forms of body-language; with a computer our only communicators are the screen and the loudspeaker.

It is reasonable that at the end of a teaching session the student wants to know the results. We are not thinking in terms of pass or fail. We are thinking of two aspects of evaluation. After an answer has been given to a question we must state whether or not the answer was correct; also, at the end of the session we must give an overall picture of the achievement.

There are two specific points which must be mentioned, particularly in connection with computer teaching. When evaluating an answer it is not sufficient to say whether the answer was correct or not. If it was not we must show how the correct answer may be obtained and what it is. This point requires some further thought.

Presumably, we have already explained how to answer questions of this kind. If the answer is incorrect it could be due to the fact that the student was not paying attention, or simply made a mistake. It could also be the case that our explanation did not suit that particular student. We must give careful thought to the question of how to present the correct solution to a problem which the student missed. Should we present the same solution again, or should we re-structure it in a different way?

These questions must be decided by the writer of the program, paying full attention to its nature but the question must be asked and answered, preferably before we start writing the program. If a verbal explanation was used originally, we may start thinking of a graphical explanation if evidence shows that, for some reason or



another, the first method of explanation has failed.

The second point mentioned concerns our overall assessment at the end of a session. It must be in a form which is meaningful to the type of student who is to benefit from the program. No teacher would, after a spelling test for seven-year-olds, give them the result as a percentage. It simply means nothing to them but it is all too easy to make the same mistake when we write a computer program, probably because we do not see their faces when writing the program and need to be reminded of their limited ability to understand us.

Under this heading of evaluation, we must mention the importance of reward when teaching. The psychologist, Pavlov, has taught us the importance of reward; true, his studies mainly concerned dogs, but reward is still effective with human learners. The only real question is what form should the reward take?

One might be tempted to think that it is fictitious, After all, what does a tick beside an answer tell the child; apart from the obvious that the answer is correct? It sounds surprising, but reward works wonders in a teaching situation. We cannot give away 10 pence pieces from the computer every time the answer is correct but we can show a pleasant pattern on the screen, perhaps add one more line to an incomplete mystery drawing, or play a simple tune. One way or another, we should think of a scheme of giving rewards; it will pay dividends to do so.

Demonstration

Listing one is a demonstration program, showing some of the features we have discussed. It is intended as a demonstration and not a complete working example. It works, but it has some deliberate shortcomings. We will discuss ways of improving it, and some others will be suggested during the next few issues. Please send your comments and observations, via the editor of *QL World.*

Apart from looking at the technicalities of programming for educational software, some of which will be presented next month, let us examine the listing with a view to the points mentioned in this article.

We have decided that the aim of the program is to teach percentages to students in the early years of their comprehensive education. We are to teach the technique of calculating percentages, rather than the theoretical basis of it. Only simple questions will be tackled, known in the trade as forward calculation of percentage as opposed to backward calculation, where the final figure, including a per-

QL EDUCATION...

centage is given, and the learner is required to find the original number.

It is the aim of the program to teach the simple rule that, to calculate the percentage of a number, you multiply the number by the required percentage and divide it by 100. Both the number and the required percentage are generated by the program in the Procedures: number & percent. The number is limited to be between 10 and 999 (by line 2110) and the required percentage cannot be greater than 100, by virtue of lines 2210 and 2220.

Error trapping

Precautions have been taken to make sure that the program cannot crash due to a non-numeric entry, when a number is required. If you use a different checking routine, please make sure to include a line to trap commas entered as part of a number. Both on the European and the American continents it is widely accepted practice to use the ',' to separate groups of three digits of larger numbers. Our program should reject such inputs and simply re-present the request for a numeric input.

There are 2 GOTOs in the program, which might offend purist supporters of structured programming, but it was thought that in the given instances it was clearer to use GOTO rather than to try to circumvent it.

The demonstration program leaves something to be desired both in the field of correcting wrong answers, and the lack of reward. It also lacks the proper use of colours, windows and sound. All these shortcomings will either be corrected in subsequent listings, or you will be advised how to do it yourself.

To run the program, simply "L run mdv_1 PERCENT", and follow all the prompts. Next month we shall look into the techniques we have used in this instalment and others which we aim to use in the future.

LISTING 1

```
100 REMark **************************
110 REMark *** Listing 1.           ***
120 REMark *** Educational Progs.   ***
130 REMark ***                      ***
140 REMark *** Percentages.         ***
150 REMark *** Leslie Fahidy        ***
160 REMark *** December 1986        ***
170 REMark **************************
180 REMark +++ Examples start here.
190 CLS:CLS#0:OK=0:NOT_OK=0
200 AT 10,8
210 UNDER 1
220 PRINT"P E R C E N T A G E."
230 UNDER 0
240 AT 18,1
250 PRINT"Press any key to continue."
260 cont$=""
270 REPeat loop
280  cont$=INKEY$
290  IF cont$<>"" THEN EXIT loop
300 END REPeat loop
310 CLS
320 FLASH 1
330 PRINT"To find the ";
340 INK 1:
350 PRINT"percentage ";
360 INK 7
370 PRINT"of a ";
380 INK 4
390 PRINT"number:"
400 INK 7
410 FLASH 0
420 PRINT:PRINT"Multiply the ";
430 INK 1
440 PRINT"P";:INK 7
450 PRINT"ercentage by the ";
460 INK 4:PRINT"N";
470 INK 7:PRINT"umberand divide by";
480 PRINT" 100"
490 PRINT:UNDER 1:PRINT"Example.":UNDER 0
500 REPeat loop
510  start=8:finish=18
520  erase start,finish
530  number:percent
540  AT 8,1
550  PRINT"Find the ";
560  INK 1:PRINT P;:INK 7
570  PRINT" percent of ";:INK 4
580  PRINT N:INK 7
590  INK 1:AT 10,8:PRINT P;
600  INK 7:PRINT" X ";
610  INK 4:PRINT N;
620  INK 7:PRINT" /100 =";
630  PRINT N*P/100
640  AT 18,1
650  PRINT"Press any key for more";
660  PRINT" examples,"
670  AT 19,1
680  PRINT"or <ENTER> to stop."
690  choice$=""
700  REPeat inner_loop
710   choice$=INKEY$
720   IF choice$<>"" THEN
730    EXIT inner_loop
740   END IF
750  END REPeat inner_loop
760  IF CODE(choice$)=10 THEN
770   EXIT loop
780  END IF
790 END REPeat loop
800 REMark +++ Practice starts here.
810 start=8:finish=18:faulty=1
820 AT 5,0
830 UNDER 1:PRINT"Exercises.":UNDER 0
840 REPeat loop
850  erase start,finish
860  number:percent
870  AT 8,1
880  PRINT"What is the ";:INK 1
890  PRINT P;:INK 7
900  PRINT" percent of ";
910  INK 4:PRINT N;:INK 7
920  PRINT"?"
930  AT 10,1
940  INPUT answer$
950  check
960  IF faulty THEN reject:GO TO 870
970  IF answer$<>N*P/100 THEN incorrect
     :ELSE correct
980  any_more
990  IF no THEN EXIT loop
1000 END REPeat loop
1010 CLS:CLS#0
1020 AT 10,0
1030 PRINT"You got ";OK;" right out ";
1040 PRINT"of ";OK+NOT_OK
1050 PRINT"That is ";OK/(OK+NOT_OK)*100;" percent."
1060 STOP
2000 DEFine PROCedure erase(start,finish):
     REMark---Erase part of screen
2010 character$=FILL$(" ",64)
2020 FOR j=start TO finish
2030  AT j,1
2040  PRINT character$
2050 END FOR j
2060 END DEFine
2100 DEFine PROCedure number:REMark
     ---Generate random number.
2110  N=RND(10 TO 999)
2120 END DEFine
```

```
2200 DEFine PROCedure percent:REMark
     ---Generate random percentage.
2210 P=RND(1 TO 99)
2220 IF P<35 THEN LET P=(P+100)/2
2230 END DEFine
2240 DEFine PROCedure check:REMark---
     Is input numeric?
2250 FOR j=1 TO LEN(answer$)
2260  IF (answer$(j TO j)>="0" AND answer$
     (j TO j)<="9") OR (answer$(j TO j)=".")
     THEN faulty=0:ELSE faulty=1
2270 END FOR j
2280 END DEFine
2400 DEFine PROCedure reject:REMark
     ---If input is not numeric.
2410 AT 10,1:PRINT FILL$(" ",20)
2420 AT 10,1
2430 PRINT"Digits and decimal point";
2440 PRINT" only!"
2450 AT 11,1
2460 PRINT"Press any key to continue."
2470 response$=""
2480 REPeat inner_loop
2490  response$=INKEY$
2500  IF response$<>"" THEN EXIT inner_loop
2510 END REPeat inner_loop
2520 AT 10,1
2530 PRINT FILL$(" ",63)
2540 AT 11,1
2550 PRINT FILL$(" ",63)
2560 END DEFine
2600 DEFine PROCedure any_more:REMark---
     Any more exercises?
2610 AT 17,1:PRINT FILL$(" ",63)
2620 AT 18,1:PRINT FILL$(" ",63)
2630 AT 17,1
2640 PRINT"Any more exercises? ";
2650 PRINT"(Y/N"
2660 choice$="":no=3
2670 REPeat inner_loop
2680  choice$=INKEY$
2690  IF choice$<>"" THEN EXIT inner_loop
2700 END REPeat inner_loop
2710 IF choice$="N" OR choice$="n" THEN LET no=1
2720 IF choice$="Y" OR choice$="y" THEN LET no=0
2730 IF no=3 THEN GO TO 2610
2740 END DEFine
2800 DEFine PROCedure correct:REMark---
 Answer is correct
2810 OK=OK+1
2820 AT 17,1:PRINT FILL$(" ",63)
2830 AT 18,1:PRINT FILL$(" ",63)
2840 AT 17,1
2850 FLASH 1:PRINT"W E L L  D O N E!"
2860 AT 18,1:FLASH 0:PRINT"Press any key."
2870 a$=""
2880 REPeat inner_loop
2890  a$=INKEY$
2900  IF a$<>"" THEN EXIT inner_loop
2910 END REPeat inner_loop
2920 END DEFine
3000 DEFine PROCedure incorrect:REMark    If
     answer is wrong.
3010 AT 10,1:PRINT FILL$(" ",63)
3020 AT 10,1:FLASH 1:PRINT answer$:FLASH 0
3030 NOT_OK=NOT_OK+1
3040 AT 16,1:PRINT FILL$(" ",63)
3050 AT 17,1:PRINT FILL$(" ",63)
3060 AT 18,1:PRINT FILL$(" ",63)
3070 AT 16,1:PRINT"No, the correct";
3080 PRINT" answer is:"
3090 AT 17,1
3100 FLASH 1
3110 INK 1:PRINT N;:INK 7:PRINT" X ";
3120 INK 4:PRINT P;:INK 7:PRINT"/100  = ";
3130 PRINT N*P/100:FLASH 0
3140 AT 18,1
3150 PRINT"Press any key to continue."
3160 a$=""
3170 REPeat inner_loop
3180  a$=INKEY$
3190  IF a$<>"" THEN EXIT inner_loop
3200 END REPeat inner_loop
3210 AT 16,1:PRINT FILL$(" ",63)
3220 AT 17,1:PRINT FILL$(" ",63)
3230 AT 18,1:PRINT FILL$(" ",63)
3240 END DEFine
```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TECHNICAL HELPLINE

Our QL expert Colin Opie finds the answers to your technical problems. Write to: Technical Helpline Sinclair QL World 79–80 Petty France London SW1H 9ED

Half-baked printer?

I am asking for help with my serial 8056 printer. I write a letter on the screen, press F3 for commands to print to printer. All the motions are correct, printer starts printing, but prints only half of the letter. It stops half of the way through and starts printing the last line.

F. A. Leadbetter, Middlesex.

When a printer starts printing satisfactorily and then leaps suddenly into a mind of its own, the problem is almost always due to an incorrectly-wired cable. It rarely has anything to do with a QL printer driver being set up incorrectly.

The fault is a common one when pin 4 of the QL ser 1 port — READY in — is not connected to pin 20 — DEVICE READY — of the 25-way connector at the printer end. The lack of that connection causes the QL to keep sending data when the printer is incapable of accepting it. The nett result is garbage. Check that this connection does exist. If your printer does not use a 25-way connector, you will have to look in the printer user manual for the appropriate pin to use.

The author of the original *Archive on the mend* program, Chas Dillon, would like to make it clear that it did not contain any bugs — a term used simply for convenience in the December Helpline. It used toolkit commands because the version — v1.03 — was not intended originally for general publication. For those who do not want to type-in the whole program, a fast compiled version — v1.09 — is available from PDQL, 49 Frederick Street, Birminghan B1 3MH. Tel: 021-233 3042. Price: £20.

The EP-22 Typewriter from Brother.

Getting into print

I recently bought a Sinclair QL and a Brother EP-22 typewriter. I am a complete novice to computers. I do not understand the language nor the instruction book. I wish to use the equipment for printing a few standard business letters.

Despite many late nights I fail to print. Could you tell me in simple steps how I can achieve my aims?

Michael Dunn, Polegate, Sussex.

I am unable to print from the Quill program to my Brother EP-22 typewriter.

I would be obliged if you would furnish me with the correct parameters for the INSTAL program to get the proper output from the typewriter/printer.

Gilbert Thomson, Basingstoke, Hampshire.

The Brother EP-22 and its more expensive relative, the EP-44, are excellent printers for letter-quality

Condensation

I would be grateful if you could solve a small problem when using Quill in conjunction with a Brother M-1009 printer. When using condensed characters the carriage return operates halfway across the page. The same thing happens when using Abacus and attempting to print an extended spreadsheet by using condensed type. I have, in the case of Quill, amended the printer-driver to accept 137 characters per line.

E. F. King,
Woking,
Surrey.

First let us deal with the use of Quill to create long lines of text. In general, there are two types of word processing package. In one type there is no relationship whatsoever, in terms of formatting, between what is seen on the user's screen and what appears on paper. A series of embedded codes or commands is used instead to format the text as required.

In this type of word processor there is always the option to view what the text will look like when sent to a printer. Two things are likely to happen to your screen view in such cases. When a line is longer than the screen display width, either the line will be truncated or the line will wrap-around on the screen. Both modes of operation have their advantages and disadvantages.

The second type of word processor is exemplified by Quill, as the these are 'what you see is what you get' screen-based editors. In other words all the formatting is performed as you go and you are always at the final result. What relevance has this to the problem? If you edit a Quill document and limit your right margin at, say character position 78, that is exactly where Quill will finish the line, irrespective of what maximum line length may be set in the installed printer driver.

If you want your Quill document to have a right margin at position 130, for example, you must set that margin in your document in the normal way. Quill will let you go past the normal displayed maximum of 80 on a monitor screen. You will notice the use of the character 'C' at position 100 — meaning Century? — and then the return of '1', '2', and so on, meaning '110', '120' and so on respectively.

When editing lines in Quill longer than the screen width, do not be deterred because your current line may appear to be wrapping around to the next line at the end of the screen width. It is, but that is only so that you can see what you have written without recourse to constant shifting of the screen sideways.

Whenever you press a cursor key or start a new paragraph, Quill will re-format the line(s) appropriately. Your screen will then show a series of truncated lines. You can still view the end of your lines by using the cursor keys. In this instance the screen will shift sideways to provide the necessary display.

You must edit long lines in Quill and allow a large — maximum — line length in the installed driver. A similar approach is required when using Abacus. Abacus can use the same printer driver as Quill, so setting a maximum line length for the driver need be performed only once. When using Abacus the screen shifts sideways automatically as you use additional columns and that may lead you to assume that all will be well when asking for a printout of your spreadsheet. Abacus also keeps its own record of how long a printer line should be. By default the value will be 80 characters. To change it, all you need to do is execute the Abacus design command. The last option in the design command allows you to specify the maximum line length for your printer.

output provided you do not mind being restricted, to 10 cpi. I have used an EP-44 for many years as an electronic typewriter, a terminal for modem communications to mainframes and a data/printer terminal for direct connection to microcomputers. So I know they work.

Possible explanations for getting no print are as follows. First, there is the RS232 cable. For two-way communication between the QL and a Brother EP-44 you will need these connections:

	QL		EP-44
Pin	Usage (ser 1)	Pin	Usage
1	Signal GND	7	Signal GND
2	RxD	2	SD
3	TxD	3	RD
4	Ready IN	20	ER
5	Ready OUT	5	CS

If, as I suspect, the EP-22 supports only the receipt of data from a QL, you will need only the EP-22 pins 3, 7 and 20 — connected to QL ser 1 pins 3, and 4 respectively.

Second, it is important to set up the Brother EP-22 to send and accept the data in a sensible way. That is performed in the normal way by setting the EP-22 into terminal mode and pressing the 'mode' key. My EP-44 is set up with the following characteristics in terminal mode:

Baud rate	:	1,200
Bit length	:	8
Parity	:	N
New line	:	CR
Code	:	T/W
ER	:	Y

If any of those options are not available with the EP-22, ignore them. Also, if the EP-22 will not handle data as fast as 1,200 baud, use the fastest rate possible. Only at this stage should you worry about installing the appropriate printer driver on your QL for programs such as Quill and Abacus. My EP-44 driver has the following settings:

Port	: SER1
Baud rate	: 1,200
Parity	: NONE
Lines/page	: 66
Chars/line	: 80
Cont. forms	: NO
EOL code	: CR
Preamble	: NONE
Postamble	: NONE
Underline ON	: ESC, E
Underline OFF	: ESC, R
Subscript ON	: ESC, U
Subscript OFF	: ESC, D
Superscr. ON	: ESC, D
Superscr. OFF	: ESC, U

The important points are to make the baud rate, parity and end-of-line sequence entries the same for both the QL printer driver and the EP-22 typewriter.

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★ **SUPER MEDIA MANAGER V1.12** This amazing QL manager & data recoverer controls all native and alien media (microdrives, QL disks, alien disks, ramdisks etc). Not only can you doctor damaged/corrupted disks & cartridges, but you can also import & export data from/to other computer systems (provided their disk physically fits into your drive!). You can control & maintain a library of up to 256 media. There are dozens of utilities and a lucid illustrated 90 A4 page manual. SMM costs just £39.95, or £24.95 for a version with only cartridge functions and no disk ones.

★ **EYE – Q V2.0** complete with comprehensive A4 manual the definitive QL graphics/CAD package – this is the one with all the features. Amazing smoothness, incredible power. Costs just £29.95, or £34.95 for a version to work with the GIGA MOUSE system.

★ **THE EDITOR** is the one program EVERY QL owner needs. The definitive text and word processor system, typically 10-20 times faster for some applications (full benchmarks available). Editor has about a hundred commands & is amazingly flexible – totally command file driveable! You can even handle direct machine code (not just assembly listings!) – yes, you can use THE EDITOR to edit THE EDITOR! If you are developing programs (including SuperBASIC ones), writing documents or just using your QL a lot, THE EDITOR is absolutely invaluable. The system is supplied at £29.95 with a detailed 80 page A4 manual. If you have an expanded QL, £39.95 buys you the "SPECIAL EDITION" of EDITOR with even more speed, power and commands. This is a superb product – eat your heart out, IBM/APPLE/APRICOT/DEC/AMIGA/ST users, you can't have it!

★ **BETTER BASIC** is an expert system to improve your BASIC programs (autocorrection of all correctable faults, highlighting of all others). Very few people have mastered SuperBASIC (the bad QL User Guide has a lot to answer for) – everyone else needs BETTERBASIC. This configurable utility cleans up code, annotating as it goes along. Its provisional name was DOMESTOS – it kills bugs, dead!! Cost – just £24.95 complete with lucid A4 manual.

★ **SUPER SPRITE GENERATOR V4.0** is a complete all-purpose QL animator/designer, to be used to obtain scintillating graphical effects (either for serious software or games). Its easy to use and very very smooth and fast. Damages – £29.95 complete.

★ **SUPERCHARGE V1.19** is the classic SuperBASIC compiler, giving automatic conversions of new or existing programs into high speed multitasking machine code. Speed improvements of up to 100 times are not uncommon. For those who do not need the awesome power of TURBO, there has never been a better time to buy SUPERCHARGE – its just £49.95 complete with 110 A4 page user manual.

★ **SUPERFORTH V2.0** is an ultrafast, extended implementation of FORTH – 83, with 100 A4 page manual, sound, graphics, windows, 32-bit maths, etc, etc, no knowledge of FORTH needed. An extremely powerful OTHELLO program is included (it beats all the rest, and is packed with features). The system sets you back a mere – or you can get a taster by opting for REVERSI/OTHELLO on its own for just £9.95 (allowable).

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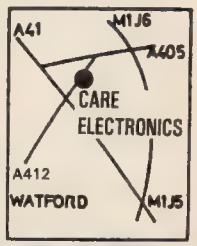

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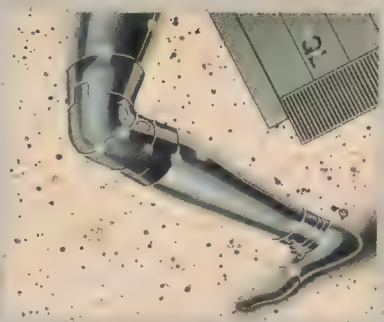
Win Taskmaster

'The Rolls-Royce of the multi-tasking packages' was Marcus Jeffery's verdict in his review last month of the new Taskmaster program from Sector Software.

This month, *Sinclair QL World* is offering readers a chance to win a free copy of this superb package, worth £25.

Fifteen copies are available, and all you have to do to win your prize is send us your account of how you would put Taskmaster to the best use.

Entries should be no more than 100 words long and should be accompanied by the coupon below. Closing date for the competition is February 28, 1987.



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UTILITY FILE

Ron Massey once again looks at new utility software and sums up its potential.

Archive Tutor and Archive Screen Format Printer
PDQL Computer Systems and Software
£21 and £7

Two programs from PDQL written by one of the world's foremost authorities on Archive management, Charles Dillon, provide a range of useful facilities for the serious amateur or professional Archive user.

Archive Tutor demonstrates many of the obvious and less obvious commands and functions, some of which have been otherwise undocumented, for Archive versions 2·0 and later.

A concise system glossary of Archive and general database terminology is included in the initial screen display.

As each successive command or function demonstration is completed, you have the opportunity either to continue to the next demonstration or to break into the sequence and repeat or select a particular command demonstration.

One of the interesting aspects of undocumented 'improvements' to 2·3 and later versions of Archive is that the collation sequence has been changed so that both upper- and lower-case letters map to upper-case letters.

The effect this has is that if your file ordering requires a distinction to be made between upper- and lower-case characters, the more recent versions of Archive will not do so automatically.

Two options to remedy the situation are available to you; you can either reconfigure your back-up copy of Archive, character by character, with the *Config_bas* included with Archive, or you can use the routine *Archbase_bin* supplied with *Archive Tutor* which will perform the same function automatically for the entire character set by simply ignoring the first occurrence of the alphabet in the character table and altering the chr$ number at the second occurrence in the table to lower-case.

Up and running, information of what *Tutor* is doing is contained in three areas of the screen; a window at the top of the screen, normally reserved for command option, shows the section name currently being dealt with in red ink; the keyword being described and demonstrated in white ink.

The result of the command being demonstrated and any descriptive or user-interactive text is written to the central portion of the screen.

Commands achieving the effect shown in the central window are displayed in the window at the bottom of the screen which is normally reserved for command inputs from either the system or the keyboard.

Archive procs used in *Tutor* are not protected in any way and users of the system are invited to examine and utilise the code contained therein in any way required.

A second Dillon utility produced by PDQL is *Archive Screen Format Printer*. This program is used for making hard copy of the screen layouts of Archive files.

Information included in the printed copy, headed by the date as set with the sdate command, and because of the size of the table, users are recommended to set their printers to condensed mode.

An additional directory is included indicating the colour changes for ink and paper and the file name and organised in an 85-column by 25-row format, is a directory of variables and where they occur on screen with the variable field size. row/column co-ordinates on-screen location of their occurrence.

The principal application of this progam is for simple and reliable maintenance of systematic records of any number of Archive database screen formats.

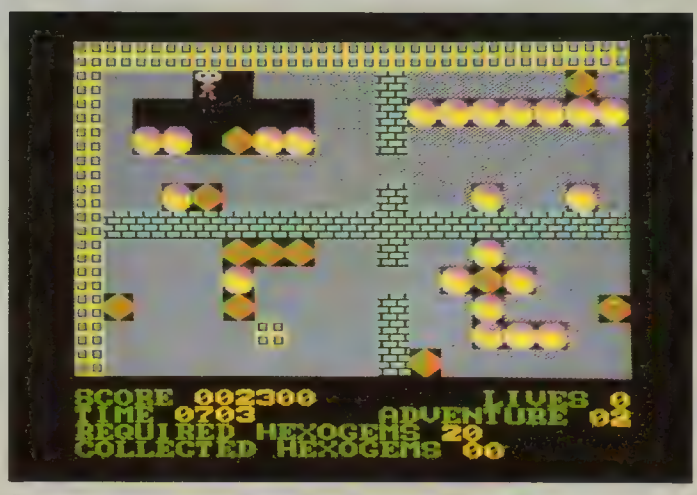
All the programs by Dillon which have passed across my desk are full of common sense. His programs are both reasonably priced and have been written to fill particular needs, often personal to him, and lack any degree of the frivolous intent sometimes seen in programs which owe their principal origin to 'wouldn't it be nice if . . .'

If Archive is your interest, then *Archive Tutor* is about the best introduction to the database system available, and *Screen Format Printer* will prove powerful additions to your software library.

Housewife
DJW Software
£4.99

Housewife is a general planner for shopping and meal control. Without doubt, someone, somewhere will object to the name of this particular program, but I cannot bring myself to think of Houseperson as an aesthetically-appealing alternative.

The main screen menu



Housewife shopping list menu.

offers access to the various features for the *Housewife* system. If you choose Cookbook from the menu, the first sub-menu contains a list of six Starters. Pressing <SPACE> pages through the sub-menus from the five main courses, to the seven desserts offered on the final sub-menu. Pressing <SPACE> again will return you to the Starters menu.

By pressing <ENTER>, the entry highlighted on a sub-menu produces a prompt for the number of diners. The recipe then displayed will specify the proper quantity of ingredients to satisfy that number. Each recipe, presumably taken from a master for the maximum of 20 diners, is displayed in correspondingly smaller quantities. This has the interesting effect of producing a recipe for two — Tournedos en croute — needing 0·3 eggs and 0·34 egg yolks, for two. The page following each ingredient list contains the method of preparation.

At each stage of paging through the Cookbook, you are offered the option to print the page displayed on screen. This is a useful feature as there is probably nothing less conducive to subsequent computerising than hot, sticky chocolate sauce in your keyboard.

Ingredient quantities are given in both Imperial and metric measurements, and oven temperatures are given in degrees Fahrenheit, Celsius and Gas Mark.

Selecting Shopping List from the main menu, you are presented with two windows. The left window contains the command menu and is the window into which information is entered. If the option to view the shopping list on-screen is chosen, the right-hand window scrolls through the default shopping items supplied with the program.

Included in the 200 items on the default list is a comprehensive range of vegetables, bread, fruit, meat, tinned goods, condiments, spices and seasonings, cereal, coffee and tea, various kitchen consumables, toiletries, frozen foods, various juices, dairy products and fizzy drinks.

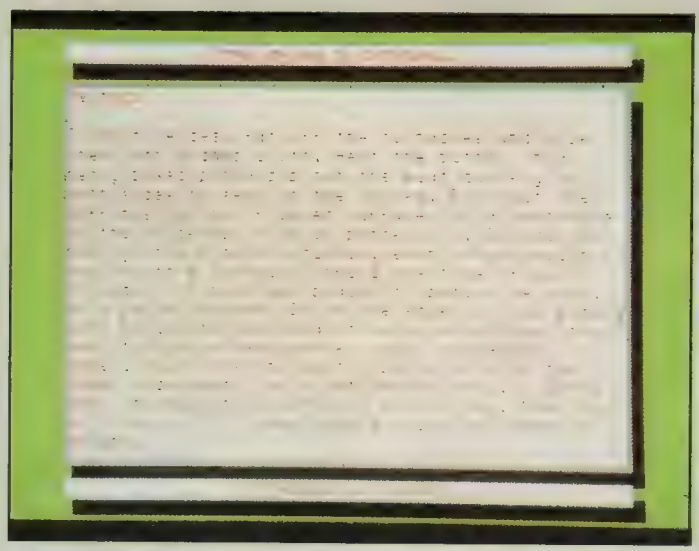
A recommendation in the comprehensive instructions is that users should make up their own shopping lists according to shelving order of their own particular supermarkets.

Facilities are provided in the program for making customised shopping lists from the master list. Once you have made the alterations satisfying your particular requirements, it can be saved in a file called *shoplist*.

Where an abbreviated list is made for an individual occasion, you have the options of Altering, Deleting or Inserting items in the master list. Conveniently, abbreviated lists can also be printed.

Different types of lists — say, clothing as one alternative type — may be made using these options, but if this is done, the lists will have to be saved on different cartridges because there is no way in the version of *Housewife* reviewed here to alter the program file call name.

The third option from the main menu allows you to set up the printer driver according to your own particular requirements and makes provision for printer ports (ser or par) and the codes for switching enlarged and condensed modes on and off for your dot matrix printer.



Housewife. Example of recipe.

Although prompts are made for you to make sure that your printer is switched on and primed with paper, error checking ensures that, where the first condition has not been met, you are returned to the program.

A rather curious omission from *Housewife*, an otherwise interesting and useful program, is that it does not support any method for the alteration of or additions to the meal menus or recipes: they are built into the program.

If the recipes had been initialised from a separate file, as is done with the shopping list and printer defaults, users would have the option of customising *Housewife* according to their own particular, no pun intended, tastes.

UTILITY FILE

Copycat
Compware
£10.99

Various methods for requiring proof of an original purchase of a program in order to run it, in an attempt to allay the ever-present problem of piracy, have been implemented by many software houses. Usually, they require that the purchased master be present in one of the drives while the program is loaded from the back-up.

Master cartridges are subject to the same ills as any other form of magnetically-stored media and, if the user is required to have the master present in order to unlock a program and the master fails, that is usually the end of the program, unless the supplier has a very lenient policy regarding replacement.

As a partial redress to the problem, Compware has produced a program it calls *Copycat* which incorporates many of the features found in its *Mdv Toolkit*.

Although *Copycat* will produce working keys of many programs, because of the diversity of protection routines available and of new ones which are always being implemented, it is not possible to produce sub-master keys from every type of media protection system.

One of the most common types of protection system is the method which relies on the format name and/or the random format number of a cartridge.

Cont p37

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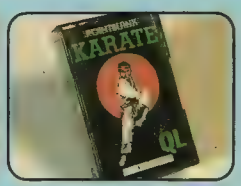

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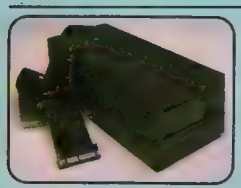

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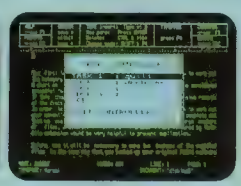
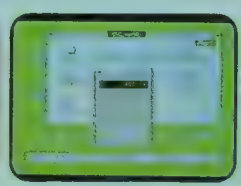

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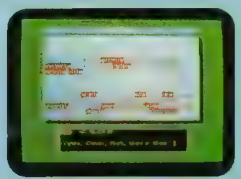

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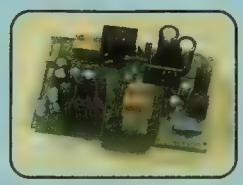

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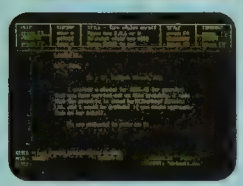
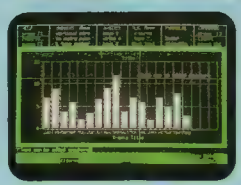


PSION XCHANGE

Version 3

Free with the Thor comes the award winning Psion Xchange suite as supplied on ICL OPD and other micros. This is a much enhanced version of the Psion QL packages, that allows you to run up to six Xchange tasks simultaneously, automatically switching data between programs. The powerful TSL, task sequencing language allows you to automatically control each task via a simple program. This makes an ideal environment for training and "non-computerate" staff. All the programs include extra features not found in the QL versions. Quill has an extract function for cutting and pasting paragraphs, mail merge with Archive, a super glossary function that allows you to assign text and commands to single keys and many other improvements to existing commands. Abacus offers several new commands including cell protection and titles command. In Archive the USR function allows you to link in machine code routines, and the SEDIT command offers improved screen designing.
Easel includes the famous 3D bar graphs to give your presentations that professional polish.



THOR PC SYSTEM SOFTWARE

Included with the Thor is an improved version of the ICE computer front end, that allows simple housekeeping to be achieved by the use or mouse or cursor. Built in screen dumps by QDUMP DANSOFT allow you to snapshot the screen at any time to the printer or a file. A much enhanced operating system gives you menu control, single key task switching between Xchange and other tasks (including Superbasic) and extended windowing capabilities.

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SOFTWARE FILE

This month software file expands its brief to look at joysticks and industry news.

Steve Davis Snooker

CDS Software
£12.95

This is definitely for people who cannot get enough of their favourite game on television, despite the fact that snooker is all that seems to be broadcast these days.

For your £12.95 you get not only the game, but a picture of smiling Steve on the box together with his endorsement. That aside, it is really very good.

Steve Davis Snooker is about the closest you can get to the real game using a joystick rather than a cue. It is available on a number of other machines and the QL version is as good as, if not better than the others.

The program offers a number of options from the start-up menu. You can play a friend, play the computer on one of nine skill levels, or edit the screen to set up trick shots or practise. One option I thought might be interesting, but which was not included was to have the computer play itself, so this is no spectator sport.

I decided to play the QL on level 5, which was probably an over-optimistic estimate of my talents, but in this game it often pays to be ambitious. An aerial view of the table is displayed with the baulk end at the left of the screen. All the balls are displayed in their usual colours, with the exception of the black and brown, which would not otherwise be visible on the black table.

The program is very obliging and allows you to break. As with all shots this involves placing a cursor at the point you want the ball to strike. Adjustment of a power meter determines the speed of your shot and side can be applied by positioning a cursor on the cue ball at the bottom of the screen.

The action is very smooth, my only complaint being that the balls seem to take an age to stop moving — just like the real thing. Steve Davis Snooker is one of those games you can enjoy from scratch but will take plenty of practice to master. To be honest, I loathe snooker, so the fact that I found the game very playable must be a recommendation.

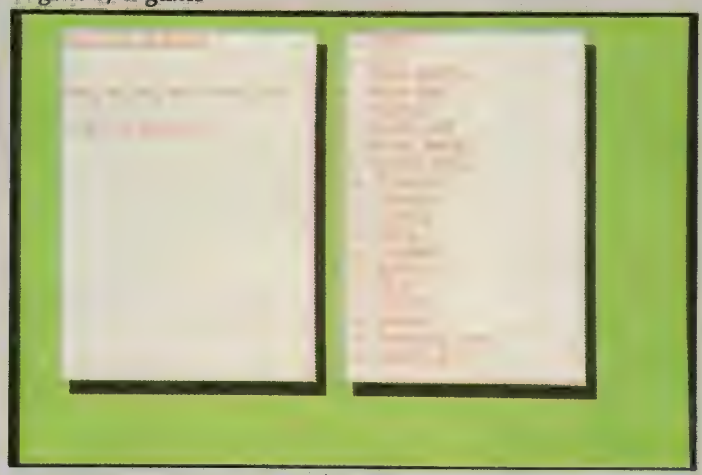
Pot luck

Stone Raider II

Microdeal
£7.95

Stone Raider is a cross between the now classic arcade games *Boulder Dash* and *Miner Man*. The object of the game is relatively simple and involves the collection of precious stones littered around numerous subterranean caves.

A gem of a game



The precious stones are called Hexogems and are collected by walking over them. While the game sounds simple to play it proves very difficult to gather these stones safely as there are numerous perils to be encountered on the way through the various caves.

Boulders are placed in precarious positions and can be made dangerously unstable by the little man mining beneath them. If they fall a life is lost and the game irritatingly returns to the beginning of the level, requiring you to re-gather all the stones in that particular cave.

There are thirty-two caves to be explored and a great deal of variety has been introduced to the game by incorporating new features as you progress through the different caves. On level 9, for example, JCB diggers are introduced and make the journey through the caves much more complicated, as they dive in straight lines through the earth or tunnel until they hit an obstacle, then ricochet in a random direction. Other hazards for our intrepid bounty hunter are the green blobs on level 9 which, if collided with, result in death and radiation from level 13 onwards which traps everything it touches.

The game seems rather simplistic at first but it rapidly proves compulsive with the players wanting to have the famous 'just one more turn'. Despite its apparent simplicity Stone Raider is a highly-playable game and is a very accurate rendition of an old favourite.

DJW Joystick

£6.95

Regular readers will have read about the DJW joystick in QL Scene last month. Next month's Software File will feature a comprehensive guide to joysticks; in the meantime we have been putting the DJW Joystick to work, testing the new software releases.

We first saw the DJW joystick two months ago. Somebody obviously took a shine to it, because shortly afterwards it was stolen from the *Sinclair QL World* offices, DJW kindly sent us another which has been kept securely under lock and key during its brief periods of inactivity.

The joystick features a fairly unusual design. The chunky handle is removable from the sturdy plastic base and is attached via a television aerial-type socket. Why this has been done is not altogether clear, though it is useful to disassemble it for storage.

The base can be stuck to a suitable surface by means of four plastic suction cups and, in practice, this is essential as the large round base is difficult to hold in one hand while wrenching the stick with the other. The only problem is that finding a suitable surface is not the easiest thing in the world. Ideally, you need a flat, smooth, clean desk top but even that is no guarantee the thing will remain stuck for any length of time.

At £6.95 including postage, the DJW is certainly good value and in operation it worked perfectly and accurately. As QL-dedicated joysticks go, it is probably the best I have seen, providing you can get to grips with the base. Having said that, if you have plenty of money to spare, one of the Atari-type joysticks for the popular games machines, fitted with an adaptor, would be a better option.

The DJW joystick.

Software news

Glasgow-based Talent Computer Systems has announced two new games to be released at the beginning of February. One, which the company describes as a "light-hearted gambling game," is *Strip Poker*, written by the German company Stefan Schmidt. The aim of the game, according to Talent sales marketing manager Veronica Colin, "is to take as many clothes as possible off Denise, who we think cheats." The game will be sold on Microdrive at £14.95.

The other release planned for February is *Oxford Trivia*, produced by the company of the same name, authors of the now familiar pub game. A first module, sold at £17.95, will contain 1,600 questions in four categories — sport, pop music, world facts, and films. If the game does well, additional modules will be released for addicted players wanting to tax their brains with yet more teasers. Some 6,000 questions have already been devised on such subjects as soccer, English literature, who's who, horse racing, motor racing, food and drink and the Beatles — allocated 970 questions all to themselves. The additonal modules will retail at around £5 each.

Talent Computer Systems is at Curran Building, 101 St James Road, Glasgow G4 0NS. Tel: 041-552 2128.

INFORMATION

Stone Raider II
Microdeal Ltd
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St Austell
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Tel. 0726 68020
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Steve Davis Snooker
CDS Software Ltd
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BETTER BASIC

Mike Lloyd provides a further insight into the way sorting routines work.

Keywords

In each instalment of Better Basic Mike Lloyd explains the workings of a SuperBasic Keyword. This month, Select.

Data sorting routines were dealt with and listings provided for three sorting procedures last month. The way in which the routines work is often not fully appreciated and so this month's article presents a program which clearly shows them at work. Called the *Demonstrator*, the program is a simulation which will work with any sorting algorithm containing a simple element swap such as:

TEMP=ARRAY (X)
ARRAY (X)=ARRAY (Y)
ARRAY (Y)=TEMP

To use it, merge the Demonstrator with an appropriate sort routine listing and, immediately after swapping lines like those above, add the line:

SWAP X,Y

using, of course, the correct pointer variables — and not the array elements. Last month's listings all contained such tag lines and the line numbers used allow the Demonstrator routines to be added directly to them. To run the routine, type DEMO and press enter.

The Demonstrator is a simulation of something which normally happens without visual indication. In this respect it is like many other processes, not all connected with computing, which can be demonstrated with ease using computers. Many of the lessons drawn from the Demonstrator apply equally to other simulations. The most important part of any demonstration routine is the presentation of information on the screen, which should be clear, accurate and attractive.

Simplicity

The way this program works is simple. Twenty numbers are printed, one beneath the other, in a window. As the sort routine works on the numbers they slide out from the list, move up or down to a new position and slide back in again. That is achieved by opening three partly-overlapping windows and using PAN and SCROLL commands to move round the numerical characters.

The remainder of the screen contains a window displaying menu options and another indicating which sort routine is working and how many swaps have been made.

The visual elements and the working elements of the program have deliberately been kept separate. That allows the working elements — the sorting procedures — to be extracted quickly for use in other programs and it allows the visual elements — listings six to 10 — to be amended without affecting the working elements. This approach is advisable with personal banking programs where the routines which present information on the screen are best kept entirely separate from those which calculate and manipulate the information.

The major procedures in the program are arranged like Russian

Listing 6 .

```
600 DEFine PROCedure demo
605 LOCal loop, choice, tot, showing,
 x, a(20)
610 initialise
615 REPeat loop
620 choice = (CODE(INKEY$(-1))-228)/4
625   SELect ON choice
630     = 1,2,3: showsort
635     = 5: CLOSE#3: CLOSE#4: EXIT l
oop
640   END SELect
645 END REPeat loop
650 END DEFine demo
```

Listing 7.

```
700 DEFine PROCedure initialise
705 MODE 8: OPEN#3,scr: OPEN#4,scr
710 WINDOW 512, 256, 0, 0: CLS
715 PAPER 5: RESTORE
720 screen 1, 142, 206, 298,  14, 2
725 screen 0, 220,  65,  50,  24, 4
730 FOR x = 1 TO 6:READ d$:PRINT#0,d$
735 screen 0, 220,  60,  50, 140, 6
740 FOR x = 3, 4
745 WINDOW#x, 50,200, 300+84*(x=3),16
750 PAPER#x, 2: CLS#x
755 END FOR x
760 DATA "SORT DEMONSTRATOR","Select.
..","f1 - Bubble Sort","f2 - Insert S
ort"
765 DATA "f3 - Quicksort","f5 - Quit
program"
770 END DEFine initialise
```

dolls, one inside the other. The DEMO routine — listing six — calls SHOWSORT, which calls one of the sorting procedures, which calls the SWAP routine. In other words, they are nested. The remaining two listings — seven and eight — are incidental to the main flow of the program; they initialise the screen and produce attractive window areas respectively.

DEMO begins by declaring all variables used in the program as local and then calls listing seven to set up the screen and print the menu choices. Keypresses are detected from within a loop so that invalid keys have no adverse effect on the program. A calculation is performed on the ASCII value of keys pressed to make the routine more understandable. Pressing F1 produces the value 1, and so on.

The commands to initialise the screen could be incorporated in DEMO but are listed separately in listing seven so that the real purpose of DEMO is seen clearly. INITIALISE is therefore a slave routine, called only by DEMO. It makes no assumptions about whether monitor or TV mode is selected and works satisfactorily with either. Two extra screens are opened and the default window setting is set momentarily to cover the entire display area and produce a neat background. The routine called SCREEN is then called to produce "three-dimensional" windows in front of the background. Window #1 is used to display the array being sorted and Window #0 is used to display menu choices. Finally, the attributes of the two new windows are set and control passes back to DEMO.

```
Listing 9.

900 DEFine PROCedure showsort
905 tot = 1: showing = 1
910 FOR x = 1 TO 20
915   a(x) = RND(150)
920   PRINT TO 7-LEN(a(x)), a(x)
925 END FOR x
930 SELect ON choice
935 =1:PRINT#0;"BUBBLE SORT":bubble a
940 =2:PRINT#0;"INSERT SORT":insert a
945 =3:PRINT#0;"QUICKSORT":sort a
950 END SELect
955 PRINT#0;"Sort complete"\"Press an
y key"
960 PAUSE: CLS#0: CLS
965 END DEFine showsort
```

Listing eight is a utility routine, differing from a slave routine since it is not specific to a particular program or procedure but can be used in a variety of applications. The parameters required are a valid channel number — opened to a screen or console — width and height of the window, the co-ordinates of its top left corner and the colour of screen.

```
Listing 8.

800 DEFine PROCedure screen (chan, x,
y, xpos,ypos, col)
805 WINDOW#chan, x,y, xpos+4,ypos+4
810 PAPER#chan,0: CLS#chan
815 WINDOW#chan, x,y, xpos,ypos
820 PAPER#chan, col: CLS#chan
825 INK#chan, 7*(col<4)
830 BORDER#chan, 1, 0
835 END DEFine screen
```

The arrangement of these parameters is similar to that adopted by the SuperBasic keywords BLOCK and WINDOW. The procedure first opens a window offset to the right and below the given co-ordinates and prints a black "shadow". The correct co-ordinates and window colour are then set. A useful extra is the automatic selection of a complementary INK colour to reduce the possibility of attribute clashes.

Once the screen and many of the variables have been set up, an array can be established and a selected sort routine set to work on it. That is achieved by listing nine. When the numbers are printed in Window #1 they are displayed between the areas overlapped by Window #3 and Window #4; they are also right-justified to make them easier to read.

The last procedure, listing 10, is the most important and the most frequently-called; it is responsible for shifting the array elements round on the screen. It is called from within the sort routine, using the tag lines which should already be embedded as explained earlier, and has two parameters representing the position in the list of the two values being swapped.

The procedure

Swapping is a three-stage process. First, the chosen array elements are planned to either side of the main list and into the areas covered by the overlapping windows. Second, the windows are scrolled, one up and one down, until the numbers have swapped position. Finally the elements are panned back into place in the list and the swap is complete. The procedure also displays the number of swaps made.

```
Listing 10.

1000 DEFine PROCedure swap (item1,ite
m2)
1005 LOCal x
1010 FOR x = 1 TO 4
1015   AT item1-1, 0: PAN  12, 3
1020   AT item2-1, 0: PAN -12, 3
1025 END FOR x
1030 FOR x = 1 TO (item2-item1)
1035   SCROLL#4,-10
1040   SCROLL#3,10
1045 END FOR x
1050 FOR x = 1 TO 4
1055   AT item1-1, 0: PAN  12, 3
1060   AT item2-1, 0: PAN -12, 3
1065 END FOR x
1070 AT#0, 2, 0: PRINT#0,tot!"swaps m
ade"
1075 tot = tot+1
1080 END DEFine swap
```

The listings this month should be merged with the sorting routines provided last month and then saved. To use the program, type DEMO and press enter, make a choice of short routine by pressing one of the first three function keys and then watch the array being sorted. A feature not explained on the screen is that the sorts can be abandoned at any time by pressing ESC. Once the "Sorting complete" message is displayed another menu choice can be made.

KEYWORD OF THE MONTH

This month's keyword is exceptional to SuperBasic, although both Fortran and Pascal have similar constructs. It is the SELect keyword, described variously as a "multiple IF structure" or a "sophisticated ON...GOTO command". In essence, it is a particularly neat way of offering a menu of options depending on the value of a numerical variable. Despite those descriptions, SELect has very close links with the FOR...NEXT statement in its syntax, although not in its operation.

Like most SuperBasic program control structures, SELect has a long and a short form. It also has a modified long form which saves much unnecessary typing. The typical, unmodified SELect structure looks like this:

```
100 SELect ON x
110 ON x = 0: PRINT "Zero"
120 ON x = 1 to 10: PRINT x!"is OK"
130 PRINT "Test is complete"
140 ON x = 10 to 30: PRINT x!"is high"
150 ON x = REMAINDER: PRINT x!"is invalid"
160 END SELect
```

This modified long form dispenses with much of the repetition involved:

```
200 SELect ON x
210 = 0: PRINT "Zero"
220 = 1 to 10: PRINT x!"in limits"
230 END SELect
```

The first line declares to the interpreter that what follows is a select construct and it includes the control variable name. The interpreter then moves through the succeeding lines testing the value of X against the various "ON x = " statements. When one of those statements is evaluated as being true, the commands which follow between it and the next "ON x=" statement are carried-out. The rest of the construct is ignored and program flow continues at the statement immediately following the "END SELect" statement.

The short, single line form looks like this:

```
300 SELect ON x = 5 TO
```

If there is a particular Keyword you would like explained in our Keyword Of The Month section, write to: Keyword, Sinclair QL World 79–80 Petty France, London SW1H 9ED.

```
55: PRINT x!"is OK"
```

Only a single comparison can be specified, although this may be with any number of values, and the "End SELect" statement is optional.

The similarities in syntax with FOR... NEXT commands relate to the type of variable and the ranges of values used by SELect structures. The control variable for either construct must be a numerical variable and not an integer or string variable or an expression. Again just like FOR...NEXT ranges, SELect ranges can be single values or expressed as "x TO y". Multiple options can be defined like this:

```
400 SELect ON number
410 = 1 TO 3, 5, 7, 9
420 PRINT number!"is prime"
430 END SELect
```

Values can be numerical variables, integer numbers or decimals. The keyword REMAINDER can be used to represent all values not mentioned previously in the construct. It must be the last option, because any others which follow it will automatically be ignored. There is effectively no limit to the number of options, or the number of values/ranges within each option. Incidentally, any statements which are written between the SELect statement and the first comparison statement are ignored by the interpreter.

Care should be taken to ensure that a supposedly continuous set of ranges is continuous. In the following example this is not the case:

```
500 SELect ON x
510 = 0 TO 10: PRINT "Ten or under"
520 = 11 TO 99: PRINT "Between 10 and 100"
530 = REMAINDER: PRINT "Over 100"
540 END SELect
```

Although the construct looks sensible, any decimal value between 10 and 11 will produce the message "Over 100" because it does not fit into either of the first two categories and is therefore classified under 'REMAINDER'. That clearly is incorrect and can be corrected by amending line 520 to read:

```
520 = 10 to 100: PRINT...
```

There is no danger of the value 10 causing two messages to be printed, because only the first occurrence will be acknowledged by the interpreter. All numbers between 10 and 11, however, will now prompt the correct message.

It is worth noting that there is a slight speed advantage to be gained if the most likely options are placed first in the SELect construct because that should reduce the number of comparisons the interpreter has to make before it finds a fit.

Because IF...THEN and SELect ON statements are largely interchangeable, I have conducted a few speed trials to see which is the most efficient. First, a well-written long form of SELect structure can be interpreted as quickly as a series of IF statements and it is easier to follow in a listing. Tests involving the short forms of both control statements revealed two differences in speed of execution. When there is only a single comparison made, such as:

```
IF x = 5
```

or

```
SELect ON y = 10
```

a SELect statement is slower than its equivalent IF statement in cases where the comparison is not true. When a comparison involves a range of values, e.g.:

```
IF x > 5 AND x < 10
```

or

```
SELect ON x = 12 TO 18
```

the SELect statement is considerabely faster than the alternative IF statement in cases where the comparison is not true. In all other respects, the statements are almost identical in efficiency.

In practice, the SELect statement is incomparably neat but published listings indicate that it is used only infrequently, presumably because of the reluctance of Basic programmers to try something new. Ironically, the main downfall of SuperBasic appears to be its compatibility with Basic, because programmers avoid the new and powerful features of the language and opt for the familiar but obsolescent methods of unstructured programming.

Cont from p29

Ordinarily, the former is accessible through direct keyboard input. The latter, however, requires a special machine code routine to access.

Copycat is extremely simple to use. Compware strongly recommends that it is loaded only after re-setting the QL. Once it is up and running, only two keyboard inputs are required for the screen prompts: the number of the source drive containing the master, and the number of the destination drive.

After entering the drive numbers, brief access is made to the source drive for the format name and number, followed by a formatting of the destination drive.

Screen information indicates the file names being copied as they occur and, once they are completed, there is a beep, followed by a brief warning message regarding the illegality of piracy.

Purchasers of *Copycat* never own the cartridge on which the program is recorded. Terms of sale for *Copycat* require that the user accepts that the ownership of both copyright and the master cartridge on which *Copycat* is supplied remains with Compware.

Users are entitled to make as many back-ups of *Copycat* as they require provided back-ups are used on a single QL. A further condition of the licence requires users to agree that no attempt will be made to defraud the copyright holders of any other piece of software. Violation of these terms can result in a revocation of the licence. That any acts of piracy arising from the illegal use of the program could also result in other prosecutions goes without saying.

From the viewpoint of the user, this type of program is entirely justifiable. *Copycat* is a useful utility for ensuring against 'bad or changed medium' reports and is well worth the investment.

Information

Product: Archive Tutor **Price:** £21
Product: Archive Screen Format Printer **Price:** £7
Source: PDQL Computer Systems and Software, 49 Frederick St., Birmingham B1 3NH. Tel: 021 233 3042

Product: Housewife **Price:** £4.99
Source: DJW, 11 Pound Close, Bramley, Hants, RG26 5BL

Product: Copycat **Price:** £10.99
Source: Compware, 57 Repton Drive, Haslington, Crewe, Cheshire CW1 1SA. Tel: 0270 582301

UTILITY FILE

Ron Massey in a new regular feature keeps up-to-date with all the new QL developments

Beginning with this issue, a new section will be included with Utility File on a regular basis to ensure that you are kept abreast of the latest developments in hardware and programs for the QL. Producers of QL peripherals wishing to have their upgrades detailed in this section should notify us of improvements made to their products.

Ark Distribution. Continuing its policy of making improvements to its Archive RTM-based *Cardfile, Mailfile* and *Librarian* database managers for the versions available for expanded QLs, Ark Distribution has included changes in all current versions:

1. Optional use of the current record as a template during insertion of new records into the Cardfile system.
2. Optional automatic over-write of existing files in the back-up facility of each of the three 256K systems. This allows you to over-write a back-up file with a new update without having to delete the original first.
3. The facility to print-out single or multiple whole records as well as single or multiple addresses.

Gap Software. New features have been added to its already impressive flagship, *Front Page.* Shinwa and Mannesaan Tally printers are now supported, as is PAR as a legitimate printer port.

Other improvements made to program operation include the facility to load your own character sets, such as those made with **Pyramide Nucleon.** A new text entry routine has been implemented which: a) works with all versions of QL ROMs; b) windows can now be opened over text or graphics, allowing overwriting, editing and precise positioning of text over graphics; c) vertical cursor keys now allow full window movement; d) character sets can be toggled within window.

Digital Precision. Hardly past its original launch, new routines, written in SuperBasic, have been included on the Turbo Toolkit cartridge, bringing the current total to 103. While some of these routines require compiling in order to get them to work, users have the option of modifying the procedures and functions provided in the massive file according to their particular requirements.

Also now included is a separate Library manager, written in SuperBasic, for stripping-out selected routines for the master file. Once the selection process is completed, a separate file is written which can later be compiled as a toolkit or SuperBasic extensions in the conventional manner.

New Products. New releases which will soon be available from Talent:

PCB Designer 1 — for single-sided Eurocards.

PCB Designer 2 — for double-sided Eurocards.

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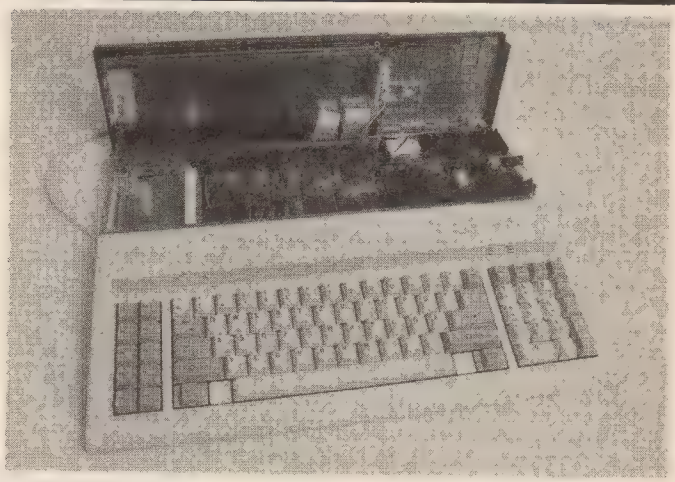

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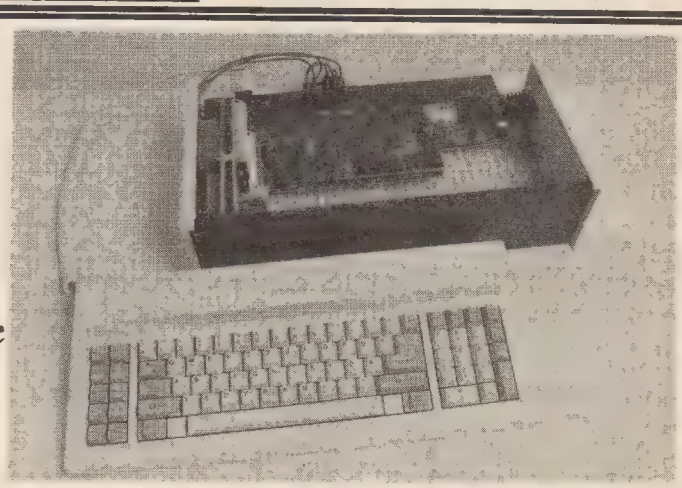
- build in two expansion slots
- fused on/off switch + net filter



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On Line

Last month our illustrious editor Ken McMahon was invited to Micronet to answer readers questions on line. As you can see the visit proved to be quite a success and below we have published screen dumps of some of the questions and answers.

MICRONET (c) 80088532a 0p
MR P A BORMAN 219994776
I like the new CONNEXIONS series in the magasine, but it's far too technical for me. Many terms are used without any definitions, eg uni-directional tri-sta te lines, so can you slow down a bit as it says it's suitable for novices.

I'll mention it to Colin Opie. You could mention it yourself by writing to him via Technical Help. We are hoping to produce the boards at the end of the series if you don't feel to confident about doing it yourself.

MICRONET (c) 80088525a 0p
MR GORDON D TWIST 919998286
Have you got any comments on OS9 (68k) I don't use a QL, I run OS9 on a Dragon but when OS9 for the QL was mentioned, It interested me as an upgrade machine, I've not been able to find out any more about it though! Gordon.

Cumana were supposed to be producing OS9 for the QL, but it never materialised.

MICRONET (c) 80088523a 0p
MR D F PEARCE 242529589
Why do a magazine with a future that is unsure? If the QL has been stopped then the QL will soon be a dead machine. Okay ,maybe you can change it to QL clones but it still would have an unsure future. LOGOTRON

Not so! Look at the Dragon which went on for years after its so - called demise. There are around 80,000 QL users in this country alone and many abroad who are happy to stick with QLs or upgrades. I think the biggest reason is that the QL was well advanced at the time of its release and is still comparatively sophisticated. A lot of its potential is only now being realised.

MICRONET (c) 80088524a 0p
MR R I THOMAS 919999145
When do you hope to have a review of the futura system printed??.

Roger

When it's ready! I think Sandy, and perhaps Tony Tebby were a little over optimistic on the release date. As soon as they have something, which will probably be around February, we will carry a full review. In the mean time we're having fun putting together a Q-XT640.

MICRONET (c) 8008853a 0p
MR S A McCONNELL 252510375
Hello Ed! Lov yur Mag! One point, could you not put some more Assembler Language articles in, please, and how to write pro type mc games. I do not think the QL is dead, but ones gotta admit its dying. From a Subscriber, Mick Mcconnell

We did that kind of an article about 18 months ago. The problem with assembler features is that not everbody has an assembler, and we like to try and please everybody.
But, if we get another 100 questions like this one.....

MICRONET (c) 80088526a 0p
Mr K DEWANE 603811532
Have you got more details on the vidio digitiser from Pyramide.

They are still working on it (same old story). I know they were having a lot of problems, although I have seen a half - working version. The good news is that an Italian company, SPEM have produced one which will probably be available from Sandy in the New Year. I've seen it - and its very good. A review is in the pipeline.

MICRONET (c) 80088527a 0p
DANNY MCGARVEY (RATH) 016682212
I intend to buy a QL soon but am intrested in games more than the buisness side.do you think that more games software will be produced in the future?

Yes. To be honest though, if your interest is solely in games, the QL is not the best machine to buy. Having said that, check out our Jan issue for a review of the best game I have ever seen on any machine - Tankbusters by Sellasoft. Its a version of the 1984 - ish coin-op 'Battlezone'.

MICRONET (c) 800885201a 0p
GERAINT E. PRITCHARD (BLOOD) 222754313
Errr. The QL comapatibles will be light years ahead of the competition? Please explain how they will be light years ahead of ST's and Amiga's. If they are I'll buy one!

I don't want to get into a 'my computer's better than yours' argument.I actually compared them with current QL technology. That's not to say I don't think they will be a match for the Atari and CBM machines. For a start they will be cheaper in that they offer a suitable upgrade path for current QL owners. But then if you don't mind paying out a few thousand pounds to replace all your software..?

MICRONET (c) 800885213a 0p
PETER MORTON 107654982
CAN YOU RECOMMEND A NICE CHEAP MODEM FO R THE QL.I DONT NEED AUTODIAL,AS LONG AS ITS A REPLACEMENT FOR THE VTX5000 I HAV E ON THE SPECTRUM. THEN I CAN RETIRE MY SPECTRUM.

Miracle Sytems QL modem is about the size of a matchbox, has autodial, a dial directory and will soon have autoanswer. It costs #49. The Astracom 1000 has beter facilities, but is bigger and costs more. Best wishes to your Spectrum on its retirement.

MICRONET (c) 80088536a 0p
STUART MCKNIGHT 919998037
Will we see an index to QL World in the future? It is maddening knowing you have seen an article but having to page through every issue to find it? Apart from that gripe,all the best for a great read. When is January issue on sale?

Good idea. We did an index last year and its about time for another. The January issue is out on the 21st December and is full of exciting things like multitasking software, desktop publishing, and bargain software (CADPAK by Datalink Systems actually).

MICRONET (c) 80088538a 0p
MR P HOLLINGWORTH 2199955313
QL Comms used to be an every month feat ure in the EMAP mag, it seems now you on ly run 'it' occaisionally. Is this becau se you dont bother to look for interest ing material nor is it just that you f eel there isnt enuff interest???

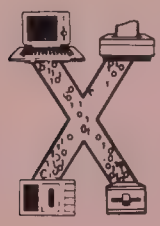
We run Comms on an occasional basis because it is primarily a hardware and, to a lesser extent a software review slot. We could put it on a monthly basis and look at other things like Micronet, BBs, rtty, etc. If that is what you want. I think QL world readers with modems can find that kind of material from other sources and we can put the space to better use loking at QL specific things.

QL CONNEXIONS

In the third part of our guide to QL interfacing, Colin Opie looks closely at the expansion port connector and how individual boards can be selected without contention.

The first two parts of QL Connexions introduced the QL expansion system and discussed briefly how external devices, synchronous and asynchronous, may be addressed. In the third part we look closely at the expansion port connector and how individual boards can be selected without contention. Most of the processor signals, obviously, are brought out to the expansion port socket on the left-hand side of the QL. When we know exactly what the port looks like we can start to design our control interface cards.

The expansion connector inside the QL is a male 64-way a/b DIN-41612 indirect edge connector. The pin-out of the connector is shown in figure one. The naming convention used is the same as that described in part one of this series. The letter 'L' is appended to all signals which are active low — e.g., the 68008 DTACK signal is given as DTACKL. Similarly, active high signals have the letter 'H' appended.



Every 68008 signal, except HALTL — the bi-directional processor HALT line — is brought out to the edge connector. They are not all used in the general case but exist so that an external master device may take over the QL circuitry completely and force the QL to become the slave device. The 68008 signals have already been covered, so at this point we will concentrate on the additional lines which exist.

Power supply lines (GND, VP12, VM12, VIN)

Four power rails are provided, GND (0v), VP12 (+12v), VM12 (−12v) and VIN (+7 to +9v). Note that no +5V rail exists. Each board must have its own form of stabilised supply, normally fed from the VIN rail on a single extension card system. A maximum of 500mA can be drawn from VIN. The 12V rails VP12 and VM12 are capable of supplying up to 100mA each.

Video signals (CSYNCL, RED, GREEN, BLUE)

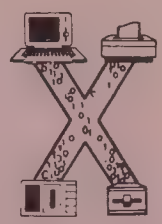
These video signals are useful to have on the expansion port to permit easy mixing with expansion graphics/text processors. The new overlaid screen display would be fed out to the display unit from the expansion card.

ROM output enable (ROMOEH)

This is simply a copy of the QL system ROM output enable signal. The line will go high whenever an access is being made to the bottom 64 kilobytes of address space.

Select peripheral lines (SP0, SP1, SP2, SP3)

These four lines are hardwired in the QL — and should be so on any motherboard system — to inform an attached peripheral card of the slot number. In an unexpanded QL the four lines are all zero — grounded. On a motherboard system they normally would alter in a pure binary sequence to produce a nibble corresponding to slot numbers 1 to 15. The precise use of SP0 to SP3 is explained in detail later.



External interrupt line (EXTINTL)

This is the general interrupt line which should be used by external peripheral device controllers and drivers which use interrupts. The QL responds to interrupts on this line by scanning through the linked list of external interrupt physical layer access routines. Part one of the series contained more information on this sequence.

Data bus grab signal (DBGL)

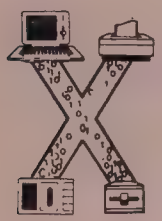
This signal may be asserted — driven low — by an open collector buffer on an expansion card, if the card requires explicitly the bi-directional data bus buffers on the motherboard expansion unit to be enabled. Normally these data bus buffers would be enabled only if address lines A18 or A19 were high — i.e., an address in the range $40000 to $FFFFF existed on the address lines. An external peripheral card

should assert only this DBGL signal if it is willing to take control of the whole of the bus system.

Data strobe — master chip signal (DSMCL)

An unexpanded QL does not look at address lines A18 and A19 when decoding its internal memory addresses. That means that, unless something is done about it, data bus contention will arise whenever an external peripheral card is attached. This DSMCL signal is, therefore, of the utmost importance.

As soon as a peripheral card recognises its own address on the address bus, it must disable the QL internal circuitry by pulling this line high. The peripheral card clearly must do this quickly and certainly before selecting any of its own chips which may output data to the data bus.



General points

The signals A0 to A19, R/WL, ASL, DSL, BGL, CLK, E, RED, GREEN, BLUE, CSYNCL, VSYNCH, ROMOEH, FC0 to FC2, and RESETL, are output signals only. It is true to say that, theoretically, the 68008 signal RESETL is bi-directional but, in general use when expanding the QL, it is used as an output signal to re-set external devices on power-up or system re-set. No card, memory or peripheral should load any output logic pin on the expansion port by more than two LS-TTL gates.

The signals DTACKL, BRL, VPAL, IPL0/2L, IPL1L, BERRL, EXTINTL and DBGL, are input lines only. They should all be pulled low, if required, by use of an open collector buffer. When not used, they should be left unconnected.

Peripheral card addressing

Now that we are aware of all the signals and lines available, we can pull together the essential parts and establish the precise operations which must take place for any expansion card if it is to be connected to the QL.

GND	a	1	b	GND
D3	a	2	b	D2
D4	a	3	b	D1
D5	a	4	b	D0
D6	a	5	b	ASL
D7	a	6	b	DSL
A19	a	7	b	R/WL
A18	a	8	b	DTACKL
A17	a	9	b	BGL
A16	a	10	b	BRL
CLK	a	11	b	A15
RED	a	12	b	RESETL
A14	a	13	b	CSYNCL
A13	a	14	b	E
A12	a	15	b	VSYNCH
A11	a	16	b	VPAL
A10	a	17	b	GREEN
A9	a	18	b	BLUE
A8	a	19	b	FC2
A7	a	20	b	FC1
A6	a	21	b	FC0
A5	a	22	b	A0
A4	a	23	b	ROMOEH
A3	a	24	b	A1
DBGL	a	25	b	A2
SP2	a	26	b	SP3
DSMCL	a	27	b	IPLO/2L
SP1	a	28	b	BERRL
SP0	a	29	b	IPLIL
VP12	a	30	b	EXTINTL
VM12	a	31	b	VIN
VIN	a	32	b	VIN

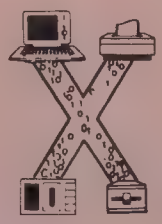
Connector
64-way a/b DIN-41612
indirect edge connector.

Figure 1.

Motherboard operations

Last month we saw briefly that either single expansion cards could be inserted into the QL or a series of cards could be inserted simultaneously by using what is known as a motherboard. These options are shown in figure two.

The essential role of any motherboard would be the provision of adequate buffering for all output and bi-directional



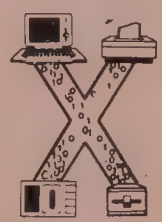
lines. Normally, the data bus buffers will be enabled only if address lines A18 or A19 are high — i.e., an address in the range $40000 to $FFFFF exists on the address lines. This is a kind of safety net to try to eliminate data bus contention problems. Additionally, the motherboard will have the card slot select lines SP0 to SP3 hardwired, so that each slot has its distinct number.

If no motherboard is present, as would be the case in a single card expansion system, there will clearly be no additional line buffering. The select lines SP0 to SP3 are grounded in the QL to provide the default slot number of zero.

Expansion card addressing

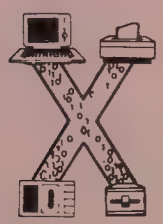
The cards are within a 16 kilobyte block in the address range $C0000 to $FFFFF. That means that address lines A18 and A19 will always be high and the four address lines A14 to A17 will provide the most significant nibble of a card address. A card, placed in a slot — zero or otherwise — must not recognise the least significant 14 bits — i.e., 16 kilobytes worth — of its address on the bus unless the card address nibble given by A14 to A17 agrees with the slot select lines SP0 to SP3, respectively.

If you are confused let me explain it a second way to make sure that we are clear on this point. The top two address lines A18 and A19 are always high when a peripheral I/O card is being addressed. Any one card has 16 kilobytes allocated to it and that requires address lines A0 to A13 — i.e., 14 lines — to cover it. If each card looked at the top two lines and the bottom 14 lines, contention would arise when two or more cards were attached at the same time.



A way of selecting each card definitively is to use the remaining four address lines — A14 to A17 — as the card select address. That is satisfactory so far as it goes but we want to be

able to plug any card into any slot position and possibly connect two identical cards at the same time. If the cards worked simply on the said address nibble, contention would still arise. To overcome the contention problem, each slot is force-fed a select nibble — given by SP0 to SP3. Only when the address nibble A14 to A17 agrees with the card select nibble may the attached card recognise itself as being selected.



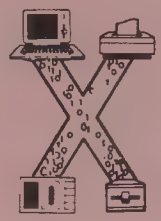
An unexpanded QL does not look at address lines A18 and A19 when decoding its internal memory addresses. That means that, unless something is done about it, data bus contention will arise whenever an external peripheral card is attached. As soon as a peripheral card recognises its own address on the address bus, it must disable the QL internal circuitry by pulling the DSMCL line high.

Clearly, the peripheral card must do this quickly, and certainly before selecting any of its own chips.

The three chips used in the circuit are chosen because we can make full use of them and, therefore, keep down the chip count. With just one more chip — the VPAL/VMAL generator a 74LS73 — we can obtain sufficient decoding for an interrupt-driven 6522 VIA I/O port, together with up to 8KB of device driver ROM space. Note especially the use of a high-speed switching transistor to pull DSMCL high. The decoding delays in the rest of any board design will ensure that the DSMCL line is asserted before any expansion board chips become fully selected.

68000 processor addressing control

As we saw at the beginning of this series, the 68000 processor family addresses external chips in either asynchronous or synchronous modes. Once an expansion board has been selected successfully and it has disabled the QL data bus by pulling DSMCL high, one of the two lines VPAL or DTACKL must be used appropriately to control data transfers between processor and device. If synchronous — slow 68xx/65xx-type accesses are required, VPAL must



be used. If asynchronous — normal 68000-type access are assumed, DTACKL should be used.

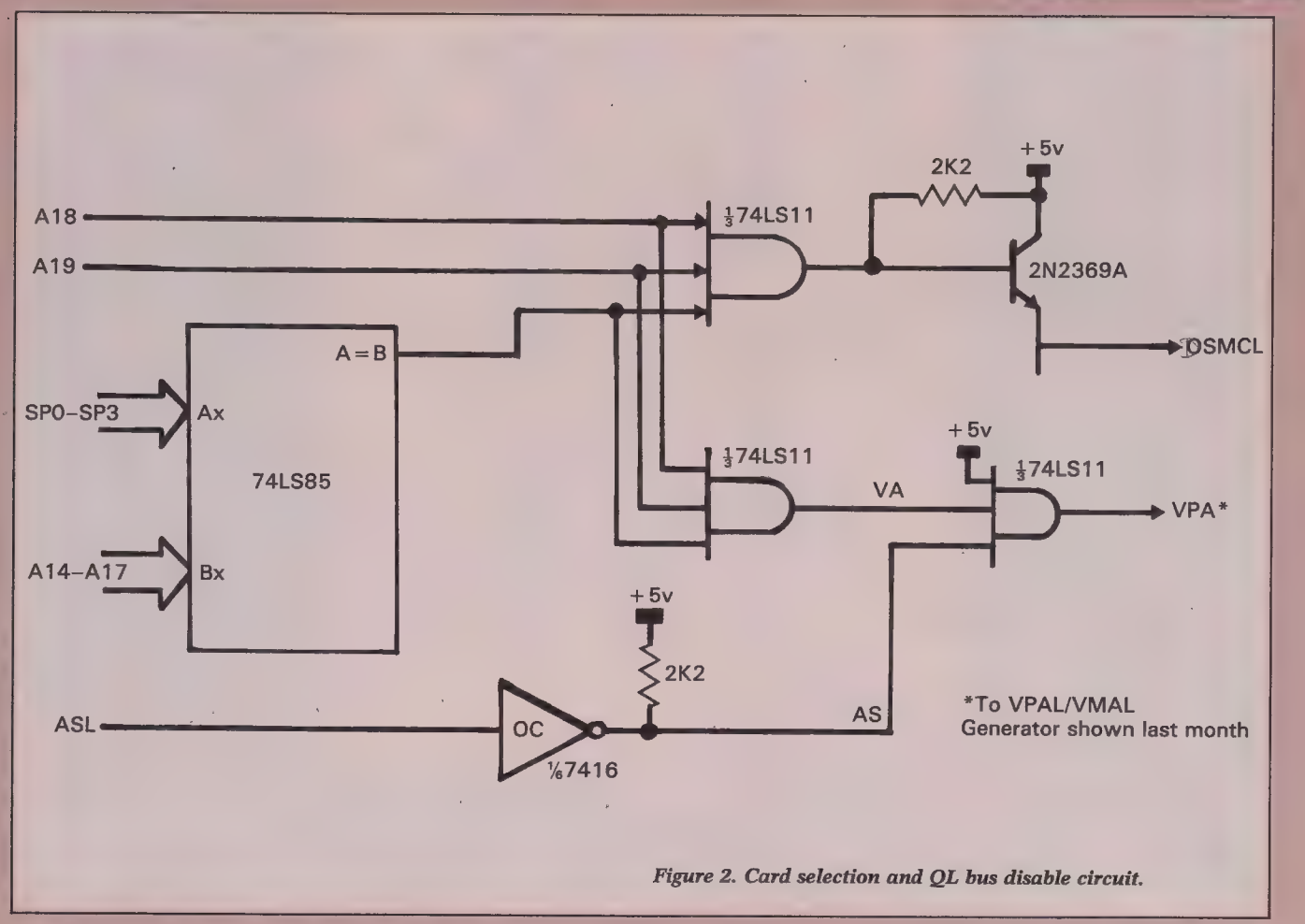
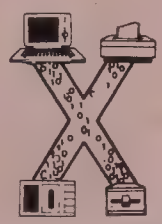


Figure 2. Card selection and QL bus disable circuit.

● *Next month we introduce device driver specifications and expansion port ROM software.*



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SOFTWARE APPLICATIONS

Stephen Peter dispensed with manual methods in the pharmacy with the help of his QL and the Psion suite.

The arrival of the QL was heralded as bringing business computing within the reach of the average man in the street. Having been an avid follower of Sinclair computers, I could not wait to get hands-on experience — I was that man in W H Smiths fighting off the assortment of youths waiting for a chance to try it.

I am a pharmacist and could see immediately many areas where the QL could be put to good use. I am a manager rather than an owner, so purchase and sales ledgers are left to head office but there is still plenty of scope for the QL. Most pharmacies are divided into two more or less discrete functions — dispensing prescriptions and the sale of various sundries.

The dispensing side of the business often causes most headaches. Dispensing is contracted to the Government and payment is normally made by estimate three months in arrears. Final payment can take place only when the ingredient value of the prescriptions has been evaluated at a pricing bureau and can take months to be completed.

The pricing bureau is in the process of being computerised. If it sounds complex you should try running a business under those conditions. It can become very difficult to determine exactly how well the business is doing.

Enter the QL and the Psion spreadsheet to monitor cashflow, calculating approximate values for prescriptions, and a graphics package to put all the figures into a more readily-understandable form. So much for the theory. What about the practice?

The first thing I discovered was that it is very easy to become bogged down with figures and to generate data which will never be put to use. It is possible to calculate vast quantitites of detailed information but how relevant is it? So lesson one was do not put anything into the spreadsheet which cannot be put to practical use. It only makes it appear cumbersome and more difficult to see the relevant information.

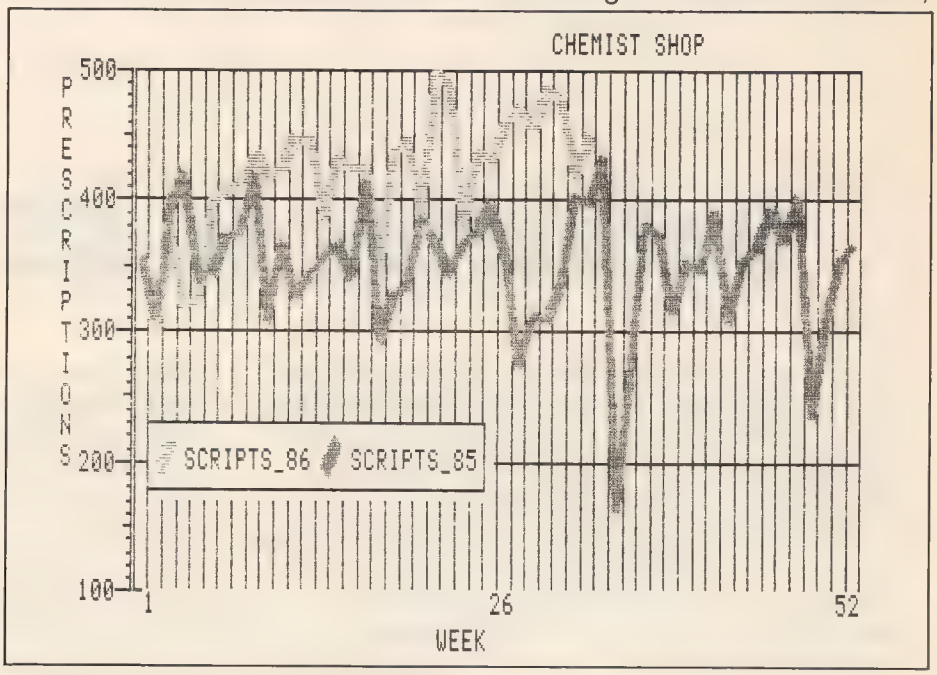
Impossible

So I took pen and paper — often a good way to start — and mapped-out all the information I could possibly hope to obtain from the spreadsheet and then set about turning it into a form suitable for Abacus. Having spent some time setting-up the design of my spreadsheet, inserting headings, dotted lines and spaces in appropriate places to make it easier to read, I found that it was virtually impossible to export data to Easel.

Lesson two, therefore, was that it may be necessary to compromise Abacus layout to assist exporting data or, as an alternative, to have a separate spreadsheet used for export only.

Then follows the next decision. Easel has produced excellent colour graphics showing how turnover has altered, but how does one turn it into something to send to the managing director? A colour printer/plotter would be useful but they are far too expensive for me. I chose a Brother M1009 which has since proved to be most reliable but many times I curse my lack of foresight for not getting an NLQ printer.

Quill gives correspondence a professional appearance and puts the



The ups and down of pharmaceutical sales.

two-fingered typist on an equal footing with the most experienced secretary — at least as far as appearance is concerned. Unfortunately, dot matrix printers can quickly cancel this advantage. Next time I shall know better. I noticed the other day that Brother has now produced a version of the M1009 incorporating NLQ which is my idea of the perfect small printer.

Still, the graph printouts look impressive, so much so that I was asked to calculate figures for all 14 branches — a mixed blessing if ever there was one, though somehow work done on a computer always seems more of a treat than a chore to me.

Then I was asked to produce graphs showing total turnover, including counter business. Having given a great deal of consideration to the initial setting-up of the spreadsheet, it did not take too much effort to incorporate counter takings to give a reasonably accurate picture of turnover.

Elaborate

Next I looked at Archive to see what could be done with it. It had been suggested that pharmacists should keep patient records in a similar way to doctors. So I set up an elaborate filing system on Archive, using single key entries for all the search facilities.

Then the Data Protection Act became operative and I chose to erase all the personal details. At least the programs are ready should the need ever arise. I still cannot understand why computer records should be subject to legislation when manual files are still acceptable but you ignore the law at your peril, even when it is an ass.

Between finding all those applications and more for the Psion programs, I attempted to write two programs of my own. The Pharmaceutical Society, our governing body, had stipulated that all labels had to be typewritten and computer-based labelling systems mushroomed overnight. I would have been happy to jump on the bandwagon but unfortunately, to achieve my aims, which included stock control and monitoring of drug interactions, I wanted multi-tasking, which proved beyond me. I could not get to grips with 68000 machine code. Perhaps if one of the excellent compilers now on the market had been available at that time I would be driving a BMW now.

My second attempt to get rich quick was a system designed to help people treat common symptoms at home. Unfortunately, after many hours of programming, the software house which was interested in the project became concerned that a problem might arise if someone managed to poison themselves by misinterpreting instructions. Still, it is a good idea and I have no doubt that something along those lines will eventually be available.

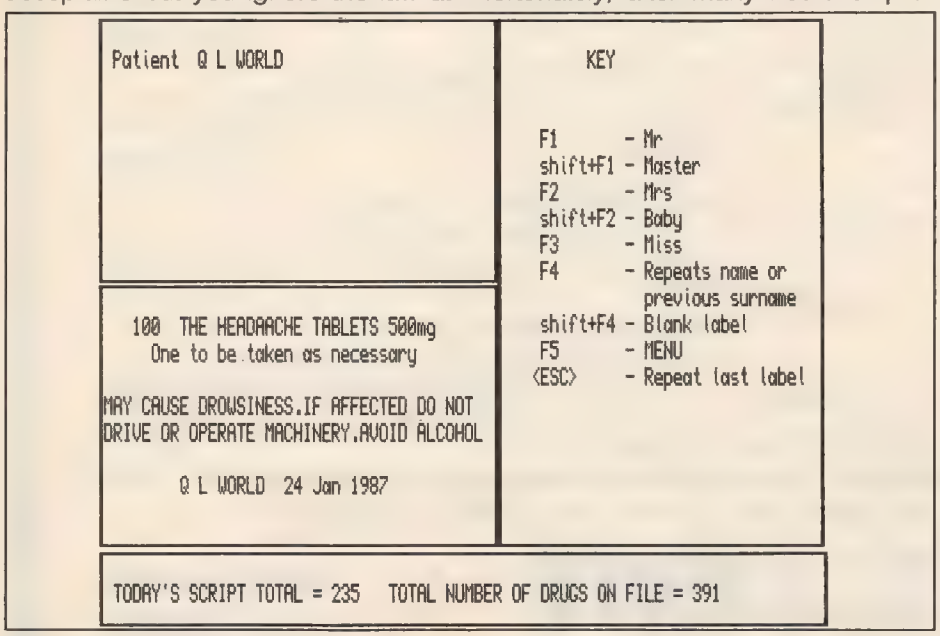
A pharmaceutical QL.

Impressed

My experience of business systems is very limited but, on the whole, I have been very impressed by the Psion suite. I am sorry to have to say, however, that the hardware has often left much to be desired — the QL has been backwards and forwards from Sinclair like a yo-yo. Even now it cannot always tell when a cartridge is present in MDV2_. As has been said by many people before me, the situation would obviously be totally unacceptable if I ran a business which relied on the data stored on Microdrives.

Amstrad has attempted to remedy the situation on its business system by offering maintenance contracts but rumour has it that the Amstrad PC is not generally available yet because it gets hot under the collar and seizes up. Perhaps it really is not possible to produce a reliable business system so cheaply at the present time. Only time will tell but it is very noticeable how expensive the Amiga and QL spin-offs are proving to be.

What of the future? As soon as personal finances allow I would like to upgrade my RAM, incorporate a RAM disc and buy a compiler. Or, better still, I may be really extravagant and purchase a Futura or Thor. Armed with that sophisticated array of computer weaponry I shall once again tackle the labelling program. So long as Amstrad is not allowed to kill the QL completely — and it is for all of us to prevent that happening — I may yet be driving a BMW.



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SOFTWARE FROM SCOTLAND

PUZZLE PAGE

Marcus Jeffery expands on one of the more popular puzzles of last year. The problem is similar, but the approach will be different.

Christmas is well behind us and it is time to get down to some serious puzzles. Just over a year ago, I ran a very popular puzzle concerning series expansion. The problem $3^i\ 7^j$, and find the 1,500th term. Unfortunately, as many of you discovered, there is no easy way to expand the series. Some found clever methods of reducing the amount of work the computer had to do.

Figure 1.
The expansion of $5^{i!}$ is:
5
25
15625 . . .
The expansion of $7^{i!}$ is:
7
49
117649 . . .
The expansion of $11^{k!}$ is:
11
121
1771561 . . .

Having studied all these neat methods, I have devised a very similar puzzle where you will not be able to use them. The series you have to expand this time is:
$5^{i!} + 7^{j!} + 11^{k!}$
where: i, j, k > 0 (integers).
The difficulties here are that there are now three terms to consider, and the exponents are no longer simple numbers but a series in themselves. Namely the series of factorials — 1, 2, 6, 24, . . .

Further, I do not want anything easy like the 1,500th term. I would like you to find the 5,000th term in the series. 'Only 5,000 terms?' I hear you say. Well, just try raising '5' to the power of, say, '6!' (=720) on your pocket calculator. You will find that it is too big to be held, even in scientific notation, so it must already be more than 100 digits long. The 5,000th term is big.

Having said this, things are not so bad as they may at first appear. Try working out how many terms you will get each time you increase all the exponents by one. Having worked out an equation for this, work backwards from 5,000 terms and you will have a rough estimate of what the average factorial will be in the final term.

Anyway, I must not do everything for you, so the rest is up to you. When you have expanded the series, and found the 5,000th term, just add all the digits in the final number. Fill in this total on the entry form.

Just to clarify matters, the '!' symbol stands for 'factorial'. This is calculated by finding the product of the integer value and all the lesser integer values. So, 'n!' would be calculated as:
$n \times (n-1) \times (n-2) \ldots \times 2 \times 1$
The expression of '0'! is assumed to be unity, which is why the integer exponents i, j and k have been specified to start from one.

Figure 2.
The first few terms in the series are:

1	23
2	43
3	65
4	85
5	133
6	153
7	175
8	195
9	15643
.	.
.	.
.	.

So, if you were to expand each of the three terms separately, you would get the results shown in figure one. Combining these into an ascending series gives the results shown in figure two. These are the first

few terms of the series in which you must find the 5,000th term.

As usual, I would be very interested in seeing any programs (or proofs?) which you may devise to solve this problem.

RULES

All entries must be written on the panel provided on this page. Any other form of entry will be disqualified.

Entries must be sent by post to: PUZZLE PAGE, Sinclair QL World, 79–80 Petty France London SW1H 9ED to arrive no later than Monday, February 16, 1987.

The winner will be the first correct entry drawn out of the editor's random series expander. In the event that nobody submits the correct sum of digits, the winner will be the person with the nearest answer.

All entries will be judged by the editor of *Sinclair QL World*. The editor's decision is final, and no correspondence will be entered into regarding the result.

The sum of the digits in the 5,000th term is:
.....
Name .....
Address .....
.....
.....

THE PROGS

If you have a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, 79-80 Petty France, London SW1H 9ED. We pay for everything published at the usual page rates — £80 per thousand words.

Skyburst
Simon Ovenston

At first glance Skyburst looks very much like any other Space Invaders type game. The reason we chose it for inclusion in the progs was for its amazing speed and the excellent quality of the graphics.

If you are good enough to destroy the first wave of alien attackers — which look a little like Chinese lanterns, then you will be confronted with a swarm of attacking flies. What comes after that is anyone's guess — we are still trying to make it to level three.

To run the game first type in the listing and run it. The machine code will then be saved to your Microdrive cartridge. Next, just type in the following commands:

```
addr=respr(6000)
lbytes mdv1_data,addr
call addr
```

```
10 addr=RESPR(5034)
20 FOR n=0 TO 5033 STEP 6
30 READ a,b,c,d,e,f,g
40 IF g-a-b-c-d-e-f<>0 THEN PRINT
   "error in line ";100+(n/6)*10:STOP
50 POKE(addr+n),a
60 POKE(addr+n+1),b
70 POKE(addr+n+2),c
71 POKE(addr+n+3),d
72 POKE(addr+n+4),e
73 POKE(addr+n+5),f
80 NEXT n
90 SBYTES mdv1_data,addr,5034
95 STOP
100 DATA 75,250,13,68,219,252,877
110 DATA 0,0,0,2,65,250,317
120 DATA 0,188,32,141,126,0,487
130 DATA 34,7,78,186,5,108,418
140 DATA 82,7,190,60,0,10,349
150 DATA 102,242,65,250,0,90,749
160 DATA 32,143,78,186,9,56,504
170 DATA 54,60,255,255,50,60,734
180 DATA 0,14,52,60,0,5,131
190 DATA 112,16,65,250,9,86,538
200 DATA 32,80,78,67,56,120,433
210 DATA 0,208,65,250,9,74,606
220 DATA 32,80,67,250,8,90,527
230 DATA 78,148,65,250,9,62,612
240 DATA 32,80,73,250,0,134,569
250 DATA 66,129,18,20,56,120,409
260 DATA 0,206,78,148,44,60,536
270 DATA 0,0,0,128,78,113,319
280 DATA 78,186,12,178,81,206,741
290 DATA 255,248,78,186,9,30,806
300 DATA 96,0,1,222,0,0,319
310 DATA 0,0,0,0,0,0,0
320 DATA 0,0,0,0,0,0,0
330 DATA 0,0,0,0,0,0,0
340 DATA 0,0,0,0,0,0,0
350 DATA 0,0,0,0,0,0,0
360 DATA 0,0,0,0,0,0,0
370 DATA 0,0,0,0,0,0,0
380 DATA 0,0,0,0,1,1,2
390 DATA 1,1,1,1,1,1,6
400 DATA 1,1,1,1,1,1,6
410 DATA 1,1,1,1,1,1,6
420 DATA 1,1,1,1,0,30,34
430 DATA 100,200,0,0,0,0,300
440 DATA 0,0,0,0,0,0,0
450 DATA 0,0,0,0,0,0,0
460 DATA 0,0,0,0,0,0,0
470 DATA 1,0,65,250,255,230,801
480 DATA 32,80,209,252,0,0,573
490 DATA 1,96,67,250,255,239,908
500 DATA 66,130,20,17,225,74,532
510 DATA 209,194,20,0,196,188,807
520 DATA 0,0,0,2,237,74,313
530 DATA 209,194,34,124,0,2,563
540 DATA 0,0,192,188,0,0,380
550 DATA 0,255,228,8,227,8,726
560 DATA 239,73,211,192,210,193,1118
570 DATA 36,73,112,15,34,24,294
580 DATA 179,153,34,24,179,153,722
590 DATA 213,252,0,0,0,128,593
600 DATA 34,74,81,200,255,238,882
610 DATA 78,117,71,250,255,118,889
620 DATA 118,0,120,0,12,27,277
630 DATA 0,0,103,28,73,250,454
640 DATA 255,128,16,28,18,3,448
650 DATA 194,252,0,24,208,1,679
660 DATA 18,20,20,4,196,252,510
670 DATA 0,24,210,2,78,186,500
680 DATA 255,132,82,3,182,60,714
690 DATA 0,6,102,214,118,0,440
700 DATA 82,4,184,60,0,4,334
710 DATA 102,204,78,117,78,186,765
720 DATA 255,192,65,250,255,51,1068
730 DATA 12,16,0,2,103,76,209
740 DATA 12,16,0,1,103,24,156
750 DATA 65,250,255,60,84,16,730
760 DATA 65,250,255,28,82,16,696
770 DATA 12,16,0,50,103,30,211
780 DATA 78,186,255,154,78,117,868
790 DATA 65,250,255,36,85,16,707
800 DATA 65,250,255,4,82,16,672
810 DATA 12,16,0,50,103,6,187
820 DATA 78,186,255,130,78,117,844
830 DATA 65,250,254,243,16,188,1016
840 DATA 0,2,65,250,254,234,805
850 DATA 16,188,0,0,78,186,468
860 DATA 255,108,78,117,65,250,873
870 DATA 254,247,82,16,65,250,914
880 DATA 254,248,12,16,0,0,530
890 DATA 103,4,78,186,2,108,481
900 DATA 78,186,255,82,78,186,865
910 DATA 2,238,65,249,0,2,556
920 DATA 0,0,209,252,0,0,461
930 DATA 99,128,112,64,12,88,503
940 DATA 0,0,102,0,5,34,141
950 DATA 83,0,102,244,78,186,693
960 DATA 2,208,78,186,255,44,773
970 DATA 65,250,254,192,12,16,789
980 DATA 0,0,103,4,78,186,371
990 DATA 2,52,65,250,254,144,767
1000 DATA 82,16,12,16,0,5,131
1010 DATA 103,6,78,186,255,14,642
1020 DATA 78,117,65,250,254,126,890
1030 DATA 16,188,0,0,65,250,519
1040 DATA 254,144,12,16,0,0,426
1050 DATA 103,14,65,250,254,109,795
1060 DATA 16,188,0,1,78,186,469
1070 DATA 254,238,78,117,65,250,1002
1080 DATA 254,95,16,188,0,0,553
1090 DATA 78,186,254,224,78,117,937
1100 DATA 78,186,7,58,78,186,593
1110 DATA 6,204,78,186,6,82,562
1120 DATA 78,186,2,110,78,186,640
1130 DATA 0,172,78,186,254,198,888
1140 DATA 78,186,0,20,78,186,548
1150 DATA 3,240,78,186,0,234,741
1160 DATA 78,186,254,244,78,186,1026
1170 DATA 3,132,96,234,112,17,594
1180 DATA 71,250,0,132,78,65,596
1190 DATA 30,1,8,1,0,3,43
1200 DATA 102,0,4,136,8,129,379
1210 DATA 0,2,102,66,8,135,313
1220 DATA 0,6,18,7,178,60,269
1230 DATA 0,0,103,24,30,1,158
1240 DATA 78,186,0,104,18,7,393
1250 DATA 8,1,0,1,102,12,124
1260 DATA 8,1,0,4,102,20,135
1270 DATA 78,186,0,86,78,117,545
1280 DATA 65,250,254,0,12,16,597
1290 DATA 0,0,103,240,85,16,444
1300 DATA 96,236,65,250,253,242,1142
1310 DATA 12,16,0,238,103,226,595
1320 DATA 84,16,96,222,65,250,733
1330 DATA 253,234,12,16,0,0,515
1340 DATA 103,2,96,178,65,250,694
1350 DATA 253,216,67,250,253,219,1258
1360 DATA 18,144,92,17,65,250,586
1370 DATA 253,212,16,188,0,192,861
1380 DATA 65,250,253,202,16,188,974
1390 DATA 0,1,78,186,1,64,330
1400 DATA 96,144,9,1,0,0,250
1410 DATA 0,0,1,2,65,250,318
1420 DATA 253,176,32,80,69,250,860
1430 DATA 253,168,16,18,20,0,475
1440 DATA 196,188,0,0,0,2,386
1450 DATA 237,74,209,194,34,60,808
1460 DATA 0,0,0,200,34,124,358
1470 DATA 0,2,0,0,192,188,382
1480 DATA 0,0,0,255,228,8,491
1490 DATA 227,8,239,73,211,192,950
1500 DATA 211,193,36,73,112,15,640
1510 DATA 34,24,179,153,34,24,448
1520 DATA 179,153,213,252,0,0,797
1530 DATA 0,128,34,74,81,200,517
1540 DATA 255,238,78,117,65,250,1003
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PROGS

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1550 DATA 253,102,12,16,0,0,383
1560 DATA 102,2,78,117,78,186,563
1570 DATA 0,216,65,250,253,88,872
1580 DATA 93,16,12,16,0,30,167
1590 DATA 99,24,78,186,1,82,470
1600 DATA 78,186,1,28,176,124,593
1610 DATA 0,0,102,20,78,186,386
1620 DATA 1,68,78,186,0,182,515
1630 DATA 78,117,65,250,253,50,813
1640 DATA 16,188,0,0,78,117,399
1650 DATA 78,186,1,48,78,186,577
1660 DATA 253,140,65,250,253,33,994
1670 DATA 16,16,192,188,0,0,412
1680 DATA 0,255,65,250,253,12,835
1690 DATA 144,16,88,0,192,188,628
1700 DATA 0,0,0,255,128,252,635
1710 DATA 0,24,192,188,0,0,404
1720 DATA 0,255,65,250,252,254,1076
1730 DATA 18,16,194,188,0,0,416
1740 DATA 0,255,65,250,252,233,1055
1750 DATA 146,16,194,188,0,0,544
1760 DATA 0,255,130,252,0,24,661
1770 DATA 194,188,0,0,0,255,637
1780 DATA 194,252,0,6,208,129,789
1790 DATA 65,250,252,180,17,188,952
1800 DATA 0,0,8,0,71,250,329
1810 DATA 0,56,112,17,78,65,328
1820 DATA 65,250,252,194,16,188,965
1830 DATA 0,0,65,250,252,190,757
1840 DATA 67,250,252,200,66,128,963
1850 DATA 16,17,227,8,209,144,621
1860 DATA 78,186,4,146,65,250,729
1870 DATA 252,174,6,16,0,1,449
1880 DATA 12,16,0,24,103,0,155
1890 DATA 3,166,78,186,252,254,939
1900 DATA 78,117,10,8,0,0,213
1910 DATA 170,170,25,50,10,6,431
1920 DATA 104,45,19,10,2,0,180
1930 DATA 65,250,252,129,16,16,728
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PROGS

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1940 DATA 65,250,252,124,18,16,725
1950 DATA 65,250,252,112,42,80,801
1960 DATA 219,252,0,0,1,0,472
1970 DATA 20,0,196,188,0,0,404
1980 DATA 0,2,231,74,32,77,416
1990 DATA 209,194,34,124,0,2,563

2000 DATA 0,0,192,188,0,0,380
2010 DATA 0,255,228,8,227,8,726
2020 DATA 194,188,0,0,0,255,637
2030 DATA 239,73,211,192,211,193,1119
2040 DATA 36,73,112,7,50,24,302
2050 DATA 179,89,213,252,0,0,733
2060 DATA 0,128,34,74,81,200,517
2070 DATA 255,242,78,117,65,250,1007
2080 DATA 252,41,16,16,65,250,640
2090 DATA 252,36,18,16,34,124,480
2100 DATA 0,2,0,0,192,188,382
2110 DATA 0,0,0,255,228,8,491
2120 DATA 227,8,194,188,0,0,617
2130 DATA 0,255,239,73,211,192,970
2140 DATA 211,193,48,17,192,188,849
2150 DATA 0,0,255,255,78,117,705
2160 DATA 126,0,65,250,251,190,882
2170 DATA 12,48,0,0,120,0,180
2180 DATA 103,88,65,250,251,158,915
2190 DATA 16,48,112,0,65,250,491
2200 DATA 251,160,18,48,120,0,597
2210 DATA 65,250,251,212,32,80,890
2220 DATA 209,252,0,0,1,32,494
2230 DATA 20,0,196,188,0,0,404
2240 DATA 0,2,233,74,209,194,712
2250 DATA 34,124,0,2,0,0,160
2260 DATA 192,188,0,0,0,255,635
2270 DATA 228,8,227,8,194,188,853
2280 DATA 0,0,0,255,239,73,567
2290 DATA 211,192,211,193,36,73,916
2300 DATA 112,7,34,24,179,153,509
2310 DATA 213,252,0,0,0,128,593
2320 DATA 34,74,81,200,255,242,886
2330 DATA 82,7,190,60,0,10,349
2340 DATA 102,148,78,117,65,250,760
2350 DATA 251,58,48,80,66,128,631
2360 DATA 16,16,65,249,0,2,348

2370 DATA 128,46,208,16,84,0,482
2380 DATA 128,252,0,43,192,188,803
2390 DATA 0,0,0,255,78,117,450
2400 DATA 65,250,251,26,48,80,720
2410 DATA 66,128,16,16,65,249,540
2420 DATA 0,2,128,46,208,16,400
2430 DATA 128,252,0,64,192,188,824
2440 DATA 0,0,0,255,78,117,450
2450 DATA 65,250,250,252,82,80,979
2460 DATA 78,186,255,186,20,0,725
2470 DATA 65,250,251,52,192,252,1062
2480 DATA 0,24,208,16,192,188,628
2490 DATA 0,0,0,255,65,250,570
2500 DATA 250,226,209,193,16,128,1022
2510 DATA 65,250,250,216,82,16,879
2520 DATA 78,186,255,182,22,0,723
2530 DATA 65,250,251,17,192,252,1027
2540 DATA 0,24,208,16,192,188,628
2550 DATA 0,0,0,255,65,250,570
2560 DATA 250,200,209,193,16,128,996
2570 DATA 198,188,0,0,0,255,641
2580 DATA 198,252,0,6,214,2,672
2590 DATA 65,250,250,212,12,48,837
2600 DATA 0,0,56,0,103,34,193
2610 DATA 65,250,250,188,124,0,877
2620 DATA 182,48,104,0,103,22,459
2630 DATA 82,6,188,60,0,10,346
2640 DATA 102,242,17,131,24,0,516
2650 DATA 65,250,250,154,17,188,924
2660 DATA 0,1,24,0,78,117,220
2670 DATA 78,186,254,204,126,0,848
2680 DATA 65,250,250,136,209,199,1109
2690 DATA 12,16,0,0,102,6,136
2700 DATA 34,7,78,186,255,102,662
2710 DATA 82,7,190,60,0,10,349
2720 DATA 102,230,126,0,65,250,773
2730 DATA 250,108,12,48,0,0,418
2740 DATA 120,0,103,36,65,250,574
2750 DATA 250,86,92,48,120,0,596
2760 DATA 12,48,0,210,120,0,390
2770 DATA 99,20,65,250,250,80,764
2780 DATA 17,188,0,0,120,0,325
2790 DATA 65,250,250,80,17,188,850
2800 DATA 0,0,120,0,82,7,209
2810 DATA 190,60,0,10,102,200,562
2820 DATA 78,186,254,114,78,117,827
2830 DATA 78,186,254,108,126,0,752
2840 DATA 65,250,250,40,12,48,665
2850 DATA 0,0,120,0,103,92,315
2860 DATA 65,250,250,8,16,48,637
2870 DATA 120,0,65,250,250,10,695
2880 DATA 18,48,120,0,210,60,456
2890 DATA 0,8,178,60,0,200,446
2900 DATA 99,66,34,124,0,2,325
2910 DATA 0,0,192,188,0,0,380
2920 DATA 0,255,228,8,227,8,726
2930 DATA 194,188,0,0,0,255,637
2940 DATA 239,73,211,192,211,193,1119
2950 DATA 48,17,192,188,0,0,445
2960 DATA 255,255,176,124,0,0,810

2970 DATA 103,24,65,250,249,216,907
2980 DATA 17,188,0,0,120,0,325
2990 DATA 65,250,249,216,17,188,985
3000 DATA 0,0,120,0,78,186,384
3010 DATA 0,16,82,7,190,60,355
3020 DATA 0,10,102,144,78,186,520
3030 DATA 253,246,78,117,71,250,1015
3040 DATA 0,42,112,17,78,65,314
3050 DATA 65,250,249,227,82,16,889
3060 DATA 12,16,0,3,103,0,134
3070 DATA 0,40,78,186,1,186,491
3080 DATA 78,186,252,24,65,250,855
3090 DATA 249,196,16,188,0,238,887
3100 DATA 78,186,252,12,78,117,723
3110 DATA 10,8,0,0,170,170,358
3120 DATA 50,55,15,2,15,75,212
3130 DATA 100,200,1,0,65,250,616
3140 DATA 249,92,46,80,65,250,782
3150 DATA 249,178,67,250,249,166,1159
3160 DATA 179,136,99,2,33,33,482
3170 DATA 65,250,249,76,48,188,876
3180 DATA 0,0,126,41,65,250,482
3190 DATA 249,68,16,252,0,0,585
3200 DATA 81,207,255,250,126,23,942
3210 DATA 65,250,249,96,16,252,928
3220 DATA 0,1,81,207,255,250,794
3230 DATA 65,250,249,108,16,252,940
3240 DATA 0,0,16,252,0,30,298
3250 DATA 16,188,0,100,65,250,619
3260 DATA 249,100,126,2,32,252,761
3270 DATA 0,0,0,0,81,207,288
3280 DATA 255,248,78,186,2,28,797
3290 DATA 56,120,0,208,65,250,699
3300 DATA 2,16,32,80,67,250,447
3310 DATA 2,30,78,148,126,0,384
3320 DATA 34,7,78,186,253,242,800
3330 DATA 82,7,190,60,0,10,349
3340 DATA 102,242,65,250,249,66,974
3350 DATA 16,188,0,1,65,250,520
3360 DATA 249,56,48,188,0,0,541
3370 DATA 44,60,0,0,0,255,359
3380 DATA 78,113,78,186,5,108,568
3390 DATA 81,206,255,248,44,60,894
3400 DATA 0,0,0,255,78,113,446
3410 DATA 78,186,5,92,178,60,599
3420 DATA 0,0,102,0,250,140,492
3430 DATA 81,206,255,240,78,186,1046
3440 DATA 2,72,96,250,65,250,735
3450 DATA 248,162,46,80,65,250,851
3460 DATA 248,160,48,188,0,0,644
3470 DATA 126,41,65,250,248,152,882
3480 DATA 16,252,0,0,81,207,556
3490 DATA 255,250,126,23,65,250,969
3500 DATA 248,180,16,252,0,1,697
3510 DATA 81,207,255,250,65,250,1108
3520 DATA 248,192,16,252,0,0,708
3530 DATA 16,252,0,30,16,188,502
3540 DATA 0,100,65,250,248,184,847
3550 DATA 126,2,16,252,0,0,396
3560 DATA 81,207,255,250,65,250,1108
3570 DATA 248,178,32,188,0,0,646
3580 DATA 0,0,78,186,1,104,369
3590 DATA 126,0,34,7,78,186,431
3600 DATA 253,78,82,7,190,60,670
3610 DATA 0,10,102,242,65,250,669
3620 DATA 248,158,82,16,65,250,819
3630 DATA 248,151,82,16,12,16,525
3640 DATA 0,5,102,4,16,188,315
3650 DATA 0,0,54,60,255,255,624
3660 DATA 50,60,0,14,52,60,236
3670 DATA 0,5,112,16,65,250,448
3680 DATA 1,44,32,80,78,67,302
3690 DATA 56,120,0,208,65,250,699
3700 DATA 1,32,32,80,67,250,462
3710 DATA 0,48,78,148,65,250,589
3720 DATA 1,20,32,80,73,250,456
3730 DATA 248,92,66,129,18,20,573
3740 DATA 56,120,0,206,78,148,608
3750 DATA 44,60,0,0,0,128,232
3760 DATA 78,113,78,186,4,136,595
3770 DATA 81,206,255,248,78,186,1054
3780 DATA 0,244,96,0,249,180,769
3790 DATA 0,12,65,84,84,65,310
3800 DATA 67,75,32,87,65,86,412
3810 DATA 69,58,54,60,255,255,751
3820 DATA 50,60,0,12,116,0,238
3830 DATA 65,250,0,208,32,80,635
3840 DATA 112,16,78,67,65,250,588
3850 DATA 0,198,32,80,71,250,631
3860 DATA 247,255,114,3,146,19,784
3870 DATA 56,120,0,206,78,148,608
3880 DATA 54,60,255,255,50,60,734
3890 DATA 0,22,116,0,65,250,453
3900 DATA 0,168,32,80,112,16,408
3910 DATA 78,67,65,250,0,158,618
3920 DATA 32,80,71,250,247,224,904
3930 DATA 34,19,56,120,0,206,435
3940 DATA 78,148,65,250,0,140,681
3950 DATA 32,80,112,16,54,60,354
3960 DATA 255,255,50,60,0,34,654
3970 DATA 116,0,78,67,65,250,576
3980 DATA 0,120,32,80,71,250,553
3990 DATA 247,178,34,19,56,120,654
4000 DATA 0,206,78,148,78,117,627
4010 DATA 56,120,0,208,65,250,699
4020 DATA 0,96,32,80,67,250,525
4030 DATA 0,6,78,148,78,117,427
4040 DATA 0,34,32,32,32,32,162
4050 DATA 32,32,66,65,83,69,347
4060 DATA 83,58,32,32,72,73,350
4070 DATA 83,67,79,82,69,58,438
4080 DATA 32,32,32,32,32,32,192
4090 DATA 83,67,79,82,69,58,438
4100 DATA 56,120,0,200,67,250,693
4110 DATA 0,30,78,148,67,250,573
4120 DATA 0,36,34,136,112,45,363
4130 DATA 65,250,0,28,32,80,455
4140 DATA 50,60,0,2,52,60,224
4150 DATA 0,1,78,67,78,117,341
4160 DATA 0,0,0,5,2,0,7
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PROGS

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4170 DATA 1,0,0,0,0,0,1
4180 DATA 0,0,0,0,112,32,144
4190 DATA 54,60,255,255,65,250,939
4200 DATA 255,244,32,80,78,67,756
4210 DATA 78,117,0,118,32,32,377
4220 DATA 32,32,32,32,32,32,192
4230 DATA 32,84,72,69,32,65,354
4240 DATA 76,73,69,78,83,32,411
4250 DATA 72,65,86,69,32,76,400
4260 DATA 65,78,68,69,68,32,380
4270 DATA 32,32,32,32,32,32,192
4280 DATA 32,32,32,32,32,32,192
4290 DATA 32,32,32,32,32,32,192
4300 DATA 32,32,32,32,32,32,192
4310 DATA 32,71,65,77,69,32,346
4320 DATA 32,79,86,69,82,32,380
4330 DATA 32,32,32,32,32,32,192
4340 DATA 32,32,32,32,32,32,192
4350 DATA 32,32,32,32,32,32,192
4360 DATA 32,32,32,32,32,65,225
4370 DATA 78,89,32,75,69,89,432
4380 DATA 32,84,79,32,67,79,373
4390 DATA 77,77,69,78,67,69,437
4400 DATA 32,77,73,83,83,73,421
4410 DATA 79,78,78,186,255,118,794
4420 DATA 75,250,0,106,124,14,569
4430 DATA 78,186,0,42,34,77,417
4440 DATA 78,186,0,80,126,16,486
4450 DATA 78,186,0,54,78,186,582
4460 DATA 2,232,178,60,0,0,472
4470 DATA 102,0,248,24,81,207,662
4480 DATA 255,238,219,252,0,0,964
4490 DATA 0,44,81,206,255,216,802
4500 DATA 78,117,50,60,0,0,305
4510 DATA 52,60,0,11,54,60,237
4520 DATA 255,255,65,250,255,48,1128
4530 DATA 32,80,112,16,78,67,385
4540 DATA 78,117,50,60,255,254,814
4550 DATA 54,60,255,255,65,250,939
4560 DATA 255,28,32,80,112,24,531
4570 DATA 78,67,78,117,65,250,655
4580 DATA 255,16,32,80,56,120,559
4590 DATA 0,208,78,148,78,117,629
4600 DATA 0,42,32,32,32,32,170
4610 DATA 32,32,32,32,32,32,192
4620 DATA 32,32,32,32,32,32,192
4630 DATA 83,75,89,32,32,66,377
4640 DATA 85,82,83,84,32,32,398
4650 DATA 32,32,32,32,32,32,192
4660 DATA 32,32,32,32,32,32,192
4670 DATA 32,32,0,42,32,32,170
4680 DATA 32,32,32,32,32,32,192
4690 DATA 71,82,65,80,72,73,443
4700 DATA 67,83,32,65,78,68,393
4710 DATA 32,80,82,79,71,82,426
4720 DATA 65,77,32,68,69,83,394
4730 DATA 73,71,78,32,32,32,318
4740 DATA 32,32,32,32,0,42,170
4750 DATA 32,32,32,32,32,32,192
4760 DATA 32,32,32,32,32,32,192
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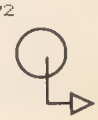

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4770 DATA 32,32,32,32,32,32,192
4780 DATA 32,32,66,89,32,32,283
4790 DATA 32,32,32,32,32,32,192
4800 DATA 32,32,32,32,32,32,192
4810 DATA 32,32,32,32,32,32,192
4820 DATA 0,42,32,32,32,32,170
4830 DATA 32,32,32,32,32,32,192
4840 DATA 32,32,32,32,83,73,284
4850 DATA 77,79,78,32,79,86,431
4860 DATA 69,78,83,84,79,78,471
4870 DATA 32,32,32,32,32,32,192
4880 DATA 32,32,32,32,32,32,192
4890 DATA 32,32,0,42,32,32,170
4900 DATA 32,32,32,32,32,32,192
4910 DATA 32,32,32,32,32,32,192
4920 DATA 32,32,32,32,32,32,192
4930 DATA 32,32,32,32,32,32,192
4940 DATA 32,32,32,32,32,32,192
4950 DATA 32,32,32,32,32,32,192
4960 DATA 32,32,32,32,0,42,170
4970 DATA 32,32,69,65,82,84,364
4980 DATA 72,32,73,83,32,66,358
4990 DATA 69,73,78,71,32,65,388
5000 DATA 84,84,65,67,75,69,444
5010 DATA 68,32,66,89,32,65,352
5020 DATA 76,73,69,78,83,32,411
5030 DATA 70,82,79,77,32,32,372
5040 DATA 0,42,32,65,78,79,296
5050 DATA 84,72,69,82,32,80,419
5060 DATA 76,65,78,69,84,46,418
5070 DATA 32,73,84,32,73,83,377
5080 DATA 32,89,79,85,82,32,399
5090 DATA 74,79,66,32,84,79,414
5100 DATA 32,68,69,70,69,78,386
5110 DATA 68,32,0,42,32,32,206
5120 DATA 32,32,32,32,32,32,192
5130 DATA 32,32,32,32,69,65,262
5140 DATA 82,84,72,32,87,73,430
5150 DATA 84,72,32,89,79,85,441
5160 DATA 82,32,83,72,73,80,422
5170 DATA 46,32,32,32,32,32,206
5180 DATA 32,32,32,32,0,42,170
5190 DATA 32,32,32,32,32,32,192
5200 DATA 32,32,32,32,32,32,192
5210 DATA 32,32,32,32,32,32,192
5220 DATA 32,32,32,32,32,32,192
5230 DATA 32,32,32,32,32,32,192
5240 DATA 32,32,32,32,32,32,192
5250 DATA 32,32,32,32,32,32,192
5260 DATA 0,42,32,32,32,32,170
5270 DATA 32,32,32,32,32,32,192
5280 DATA 89,79,85,82,32,70,437
5290 DATA 76,73,71,72,84,32,408
5300 DATA 67,79,78,84,82,79,469
5310 DATA 76,83,32,65,82,69,407
5320 DATA 32,58,32,32,32,32,218
5330 DATA 32,32,0,42,32,32,170
5340 DATA 32,32,32,32,32,32,192
5350 DATA 188,32,58,32,76,69,455
5360 DATA 70,84,32,32,189,32,439
5370 DATA 58,32,82,73,71,72,388
5380 DATA 84,32,32,190,32,58,428
5390 DATA 32,70,73,82,69,32,358
5400 DATA 32,32,32,32,0,42,170
5410 DATA 32,32,32,32,32,32,192
5420 DATA 32,32,32,32,32,91,251
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PROGS

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5430 DATA 69,83,67,93,32,84,428
5440 DATA 79,32,65,66,79,82,403
5450 DATA 84,32,77,73,83,83,432
5460 DATA 73,79,78,32,32,32,326
5470 DATA 32,32,32,32,32,32,192
5480 DATA 0,42,32,32,32,32,170
5490 DATA 32,32,32,32,32,32,192
5500 DATA 32,32,32,32,32,32,192
5510 DATA 32,32,71,79,79,68,361
5520 DATA 32,76,85,67,75,32,367
5530 DATA 32,32,32,32,32,32,192
5540 DATA 32,32,32,32,32,32,192
5550 DATA 32,32,0,42,32,32,170
5560 DATA 32,32,32,32,32,32,192
5570 DATA 32,32,32,32,32,32,192
5580 DATA 32,32,32,32,32,32,192
5590 DATA 32,32,32,32,32,32,192
5600 DATA 32,32,32,32,32,32,192
5610 DATA 32,32,32,32,32,32,192
5620 DATA 32,32,32,32,0,42,170
5630 DATA 32,32,32,32,32,32,192
5640 DATA 32,32,65,78,89,32,328
5650 DATA 75,69,89,32,84,79,428
5660 DATA 32,67,79,77,77,69,401
5670 DATA 78,67,69,32,77,73,396
5680 DATA 83,83,73,79,78,32,428
5690 DATA 32,32,32,32,32,32,192
5700 DATA 122,0,71,250,0,28,471
5710 DATA 112,17,73,250,0,28,480
5720 DATA 24,133,78,65,178,60,538
5730 DATA 0,0,102,8,82,5,197
5740 DATA 186,60,0,8,102,228,584
5750 DATA 78,117,9,1,0,0,205
5760 DATA 0,0,0,2,0,0,2
5770 DATA 10,10,0,0,0,0,20
5780 DATA 0,0,10,10,0,0,20
5790 DATA 0,0,2,2,170,170,344
5800 DATA 168,168,0,0,10,10,356
5810 DATA 168,168,130,130,0,0,596
5820 DATA 2,2,170,170,168,168,680
5830 DATA 0,0,0,0,10,10,20
5840 DATA 0,0,0,0,0,0,0
5850 DATA 168,168,160,160,0,0,656
5860 DATA 2,2,162,162,8,8,344
5870 DATA 0,0,10,10,168,168,356
5880 DATA 130,130,0,0,42,42,344
5890 DATA 162,162,0,0,128,128,580
5900 DATA 130,130,168,168,138,138,872
5910 DATA 32,32,168,168,2,2,404
5920 DATA 160,160,32,32,170,170,724
5930 DATA 168,168,128,128,32,32,656
5940 DATA 42,42,162,162,32,32,472
5950 DATA 128,128,42,42,168,168,676
5960 DATA 130,130,128,128,2,2,520
5970 DATA 170,170,168,168,0,0,676
5980 DATA 0,0,0,0,160,160,320
5990 DATA 0,0,0,0,0,0,0
6000 DATA 160,160,0,0,0,0,320
6010 DATA 42,42,170,170,128,128,680
6020 DATA 0,0,170,170,32,32,404
6030 DATA 32,32,0,0,42,42,148
6040 DATA 170,170,128,128,0,0,596
6050 DATA 0,0,160,160,0,0,320
6060 DATA 0,0,10,10,138,138,296
6070 DATA 0,0,0,0,42,42,84
6080 DATA 32,32,128,128,0,0,320
6090 DATA 170,170,136,136,32,32,676
6100 DATA 2,2,170,170,32,32,408
6110 DATA 8,8,8,8,10,10,52
6120 DATA 136,136,162,162,10,10,616
6130 DATA 128,128,42,42,2,2,344
6140 DATA 10,10,170,170,136,136,632
6150 DATA 2,2,2,2,170,170,348
6160 DATA 34,34,8,8,2,2,88
6170 DATA 170,170,136,136,40,40,692
6180 DATA 0,0,42,42,170,170,424
6190 DATA 128,128,160,240,160,160,976
6200 DATA 160,80,160,0,0,240,640
6210 DATA 0,160,0,80,0,0,240
6220 DATA 10,15,10,10,10,5,60
6230 DATA 10,0,0,15,0,10,35
6240 DATA 0,5,0,0,0,170,175
6250 DATA 0,160,8,42,0,128,338
6260 DATA 2,170,128,160,8,170,638
6270 DATA 128,160,2,170,128,160,748
6280 DATA 8,170,128,160,2,42,510
6290 DATA 0,128,0,10,0,0,138
6300 DATA 0,10,0,170,0,2,182
6310 DATA 128,168,0,10,40,170,516
6320 DATA 0,10,136,170,0,10,326
6330 DATA 40,170,0,10,136,170,526
6340 DATA 0,2,32,168,0,0,202
6350 DATA 0,160,170,85,170,85,670
6360 DATA 170,85,160,80,128,106,729
6370 DATA 0,170,0,170,32,144,516
6380 DATA 32,26,0,170,0,170,398
6390 DATA 128,64,10,5,170,85,462
6400 DATA 170,85,0,0,42,26,323
6410 DATA 170,170,170,170,128,64,872
6420 DATA 170,106,170,170,170,170,956
6430 DATA 160,144,42,26,170,170,712
6440 DATA 170,170,128,64,10,5,547
6450 DATA 170,85,170,85,0,0,510
6460 DATA 32,26,0,170,0,170,398
6470 DATA 128,64,128,106,0,170,596
6480 DATA 0,170,32,144,32,26,404
6490 DATA 0,170,0,170,128,64,532
6500 DATA 10,5,170,85,170,85,525
6510 DATA 0,0,42,26,170,170,408
6520 DATA 170,170,128,64,170,106,808
6530 DATA 170,170,170,170,160,144,984
6540 DATA 170,85,170,85,170,85,765
6550 DATA 160,80,0,0,0,0,240
6560 DATA 0,0,0,0,10,5,15
6570 DATA 170,85,170,85,170,85,765
6580 DATA 10,6,170,170,170,170,696
6590 DATA 170,169,2,1,170,106,618
6600 DATA 170,170,168,148,0,0,656
6610 DATA 42,21,170,85,128,64,510
6620 DATA 2,1,128,127,0,255,513
6630 DATA 40,212,8,7,0,255,522
6640 DATA 0,255,2,253,2,1,513
6650 DATA 128,127,0,255,40,212,762
6660 DATA 0,0,42,21,170,85,318
6670 DATA 128,64,2,1,170,106,471
6680 DATA 170,170,168,148,10,6,672
6690 DATA 170,170,170,170,170,169,1019
6700 DATA 10,5,170,85,170,85,525
6710 DATA 170,85,0,0,0,0,255
6720 DATA 0,0,0,0,0,0,0
6730 DATA 0,0,0,0,0,0,0
6740 DATA 0,0,0,0,0,0,0
6750 DATA 0,0,0,0,0,0,0
6760 DATA 0,0,0,0,0,0,0
6770 DATA 0,0,0,0,0,0,0
6780 DATA 0,0,0,42,0,160,202
6790 DATA 0,0,0,0,10,39,49
6800 DATA 128,96,0,0,0,0,224
6810 DATA 10,90,128,148,0,0,376
6820 DATA 0,1,2,90,0,149,242
6830 DATA 0,0,0,21,0,106,127
6840 DATA 0,165,0,80,0,84,329
6850 DATA 0,10,0,128,0,84,222
6860 DATA 0,64,8,0,128,0,200
6870 DATA 0,4,0,0,8,0,12
6880 DATA 128,0,0,0,0,0,128
```

PROGS

```
6890 DATA 32,0,32,0,0,0,64
6900 DATA 0,0,32,0,32,0,64
6910 DATA 0,0,2,2,128,0,132
6920 DATA 10,2,0,0,0,0,12
6930 DATA 128,128,8,8,0,0,272
6940 DATA 0,0,0,0,0,0,0
6950 DATA 0,0,0,0,0,0,0
6960 DATA 0,0,0,0,0,0,0
6970 DATA 0,0,0,0,0,0,0
6980 DATA 0,0,0,0,0,0,0
6990 DATA 0,0,0,0,0,10,10
7000 DATA 0,168,0,0,0,0,168
7010 DATA 2,9,160,216,0,0,387
7020 DATA 0,0,2,22,160,165,349
7030 DATA 0,0,0,21,0,86,107
7040 DATA 128,165,0,85,0,21,399
7050 DATA 0,10,0,168,0,21,199
7060 DATA 0,0,0,2,0,160,162
7070 DATA 0,0,0,0,2,0,2
7080 DATA 32,0,0,0,0,0,32
7090 DATA 2,0,32,0,0,0,34
7100 DATA 0,0,40,32,10,2,84
7110 DATA 0,0,0,0,8,8,16
7120 DATA 8,8,0,0,0,0,16
7130 DATA 0,0,0,0,0,0,0
7140 DATA 0,0,0,0,0,0,0
7150 DATA 0,0,0,0,0,0,0
7160 DATA 0,0,0,0,0,0,0
7170 DATA 0,0,0,0,0,0,0
7180 DATA 0,0,0,0,0,0,0
7190 DATA 0,0,0,0,0,0,0
7200 DATA 0,0,0,0,0,0,0
7210 DATA 170,170,160,160,0,0,660
7220 DATA 10,10,168,86,10,170,454
7230 DATA 0,0,42,37,168,86,333
7240 DATA 0,170,128,128,42,37,505
7250 DATA 168,86,0,170,128,128,680
7260 DATA 170,149,168,86,0,170,743
7270 DATA 32,160,170,149,168,86,765
7280 DATA 0,170,32,160,170,149,681
7290 DATA 160,80,0,170,32,160,602
7300 DATA 128,170,0,160,170,85,713
7310 DATA 160,96,128,170,2,169,725
7320 DATA 170,85,160,96,128,170,809
7330 DATA 2,169,170,85,160,96,682
7340 DATA 32,42,2,169,170,85,500
7350 DATA 128,128,32,42,2,169,501
7360 DATA 170,85,128,128,10,10,531
7370 DATA 2,169,170,90,0,0,431
7380 DATA 0,0,170,170,160,160,660
7390 DATA 0,0,0,0,0,0,0
7400 DATA 0,0,0,0,0,0,0
7410 DATA 0,0,0,0,0,0,0
7420 DATA 0,0,10,10,170,170,360
7430 DATA 0,0,0,0,160,170,330
7440 DATA 42,149,160,160,2,2,515
7450 DATA 0,170,42,149,168,88,617
7460 DATA 2,2,0,170,42,149,365
7470 DATA 168,88,8,10,0,170,444
7480 DATA 42,149,170,86,8,10,465
7490 DATA 0,170,42,149,170,86,617
7500 DATA 8,10,0,170,170,245,603
7510 DATA 170,86,10,9,170,85,530
7520 DATA 160,250,2,170,10,9,601
7530 DATA 170,85,128,106,2,170,661
7540 DATA 10,9,170,85,128,106,508
7550 DATA 2,170,2,2,170,85,431
7560 DATA 128,106,8,168,2,2,414
```

```
7570 DATA 170,85,128,106,8,168,665
7580 DATA 0,0,170,165,128,106,569
7590 DATA 160,160,0,0,10,10,340
7600 DATA 170,170,0,0,0,0,340
7610 DATA 0,0,0,0,0,0,0
7620 DATA 0,0,0,0,0,0,0
7630 DATA 0,0,10,10,0,0,20
7640 DATA 0,0,0,0,32,42,74
7650 DATA 128,128,0,0,0,0,256
7660 DATA 128,170,34,162,32,32,558
7670 DATA 0,0,128,170,32,160,490
7680 DATA 136,136,0,0,32,42,346
7690 DATA 128,128,160,160,0,0,576
7700 DATA 10,10,34,34,8,8,104
7710 DATA 0,0,0,0,8,8,16
7720 DATA 0,0,0,0,8,8,16
7730 DATA 34,34,40,40,0,0,148
7740 DATA 2,2,128,128,170,150,580
7750 DATA 0,0,8,8,130,130,276
7760 DATA 170,85,128,128,2,2,515
7770 DATA 34,34,170,85,128,128,579
7780 DATA 0,0,0,0,170,150,320
7790 DATA 0,0,0,0,0,0,0
7800 DATA 40,40,0,0,0,0,80
7810 DATA 0,0,0,0,0,0,0
7820 DATA 0,0,0,0,0,0,0
7830 DATA 0,0,0,0,0,0,0
7840 DATA 0,0,0,0,0,0,0
7850 DATA 0,0,0,0,160,160,320
7860 DATA 0,0,0,0,2,2,4
7870 DATA 168,88,0,0,0,0,256
7880 DATA 10,9,170,86,0,0,275
7890 DATA 8,8,138,137,170,86,547
7900 DATA 0,0,34,34,2,2,72
7910 DATA 168,88,0,0,10,10,276
7920 DATA 8,8,160,160,0,0,336
7930 DATA 32,32,160,160,0,0,384
7940 DATA 0,0,0,0,160,160,320
7950 DATA 128,128,0,0,162,162,580
7960 DATA 10,10,0,0,2,2,24
7970 DATA 8,168,8,8,128,128,448
7980 DATA 8,10,2,170,34,34,258
7990 DATA 0,0,8,10,2,170,190
8000 DATA 0,0,0,0,2,2,4
8010 DATA 8,168,0,0,0,0,176
8020 DATA 0,0,160,160,0,0,320
8030 DATA 0,0,0,0,0,0,0
8040 DATA 0,0,0,0,0,0,0
8050 DATA 0,0,0,0,0,0,0
8060 DATA 10,5,170,85,170,85,525
8070 DATA 0,0,162,88,130,40,420
8080 DATA 130,40,160,80,130,104,644
8090 DATA 130,40,130,40,160,16,516
8100 DATA 130,104,130,40,130,40,574
8110 DATA 160,16,130,104,130,40,580
8120 DATA 130,40,160,16,130,104,580
8130 DATA 130,40,130,40,160,16,516
8140 DATA 130,104,130,40,130,40,574
8150 DATA 160,16,162,88,130,40,596
8160 DATA 130,40,160,80,10,5,425
8170 DATA 170,85,170,85,0,0,510
8180 DATA 0,0,32,32,128,128,320
8190 DATA 0,0,0,0,32,32,64
8200 DATA 128,128,0,0,0,0,256
8210 DATA 32,32,128,128,0,0,320
8220 DATA 0,0,170,170,160,160,660
8230 DATA 0,0,10,10,128,128,276
8240 DATA 42,42,0,0,170,170,424
8250 DATA 160,160,170,170,160,160,980
8260 DATA 0,0,0,0,0,0,0
8270 DATA 0,0,0,0,170,85,255
8280 DATA 170,85,160,80,10,5,510
8290 DATA 130,40,130,40,138,37,515
8300 DATA 10,4,130,40,130,40,354
8310 DATA 130,41,10,4,130,40,355
8320 DATA 130,40,130,41,10,4,355
8330 DATA 130,40,130,40,130,41,511
8340 DATA 10,4,130,40,130,40,354
8350 DATA 130,41,10,4,130,40,355
8360 DATA 130,40,130,41,10,5,356
```

PROGS

```
8370 DATA 130,40,130,40,138,37,515
8380 DATA 0,0,170,85,170,85,510
8390 DATA 160,80,0,0,2,2,244
8400 DATA 8,8,0,0,0,0,16
8410 DATA 8,8,2,2,0,0,20
8420 DATA 0,0,10,10,170,170,360
8430 DATA 0,0,0,0,168,168,336
8440 DATA 2,2,160,160,10,10,344
8450 DATA 170,170,10,10,170,170,700
8460 DATA 0,0,0,0,0,0,0
8470 DATA 0,0,0,0,0,0,0
8480 DATA 0,0,0,0,0,0,0
```

Window Designer

Neil Taylor

Window designer is a useful routine which allows you to set up windows on screen, then writes a procedure for incorporation in your own programs. First, enter the channel number, then set the position and size of the window using the cursor keys and space bar.

Having chosen the size and shape you can set up defaults for additional information. At each stage you can try out your ideas by pressing the relevant numbered key, and then pressing ENTER when you are satisfied with the selection.

When finished, enter a device name. The program will then save, to that device, a one line procedure with the following characteristics:-

Line no. — 30000 + nn
Proc name — WINDOW_nn
File name — xxxn_WINDOW_nn

Where nn is the channel number, and xxxn is the device on which the procedure is saved.

MERGE this into your program and when called, the procedure will open a window to channel #nn. It will set the paper, ink and border to the size and colours (including any stipples) specified, and clear the screen.

```
90 PAPER#0,0:INK#0,4:CLS#0
95 REPeat get_ch
100   CLS#0:INPUT #0;'Enter the channel no. for th
e window:-';ch
105   SELect ON ch = 1 TO 98:EXIT get_ch
107   INK#0,2:PRINT#0;'Only use channels 1 through
 98':INK#0,4:PAUSE 500
108 END REPeat get_ch
110 set_window ch
120 BORDER #ch,0:CLS#ch
130 set_pcol
140 set_pxor
150 IF pcol<>pxor:set_pstip
160 set_bsize
170 set_bcol
180 set_bxor
```

PROGS

```
190 IF bcol<>bxor:set_bstip
200 set_icol
210 set_ixor
220 IF icol<>ixor:set_istip
230 output_file
240 REMark ========================================
=========
250 DEFine PROCedure set_pcol
260   pcol = 0
270   REPeat get_pcol
275     PAPER #ch,pcol:CLS#ch
280     CLS#0:PRINT#0;'Select basic paper colour &
',,'press ENTER'
290     LET x=CODE(INKEY$(-1))
300     SELect ON x
310       =10:EXIT get_pcol
320       =48 TO 55:pcol=x-48
330     END SELect
350   END REPeat get_pcol
360 END DEFine
370 REMark ========================================
=========
380 DEFine PROCedure set_pxor
390   pxor=pcol
400   REPeat get_pxor
405     PAPER #ch,pcol,pxor:CLS#ch
410     CLS#0:PRINT#0;'Select colour for stipple &
/or ',,'press ENTER'
420     LET x=CODE(INKEY$(-1))
430     SELect ON x
440       =10:EXIT get_pxor
450       =48 TO 55:pxor=x-48
460     END SELect
480   END REPeat get_pxor
490 END DEFine
500 REMark ========================================
=========
510 DEFine PROCedure set_pstip
```

```
520   pstip = 3
530   REPeat get_pstip
535     PAPER #ch,pcol,pxor,pstip:CLS#ch
540     CLS#0:PRINT#0;'Select stipple pattern(0 to
 3) then',' press ENTER'
550     LET x=CODE(INKEY$(-1))
560     SELect ON x
570       =10:EXIT get_pstip
580       =48 TO 51:pstip=x-48
590     END SELect
610   END REPeat get_pstip
620 END DEFine
630 REMark ========================================
=========
640 DEFine PROCedure set_icol
650   IF pcol > 3:icol=0:ELSE :icol=7
660   REPeat get_icol
665     INK #ch,icol:CLS#ch
670     CLS#0:PRINT#0;'Select INK colour & press E
NTER'
680     AT#ch,0,0:PRINT #ch,'qwerty'
690     LET x=CODE(INKEY$(-1))
700     SELect ON x
710       =10:EXIT get_icol
720       =48 TO 55:icol=x-48
730     END SELect
750   END REPeat get_icol
760 END DEFine
770 REMark ========================================
=========
780 DEFine PROCedure set_ixor
790   ixor=icol
800   REPeat get_ixor
804     INK #ch,icol,ixor:CLS#ch
810     CLS#0:PRINT#0;'Select colour for INK stipp
le &/or ','press ENTER'
815     AT#ch,0,0:PRINT#ch;'qwerty'
820     LET x=CODE(INKEY$(-1))
830     SELect ON x
840       =10:EXIT get_ixor
850       =48 TO 55:ixor=x-48
860     END SELect
890   END REPeat get_ixor
900 END DEFine
910 REMark ========================================
=========
920 DEFine PROCedure set_istip
930   istip = 3
940   REPeat get_istip
945     INK #ch,icol,ixor,istip:CLS#ch
950     CLS#0:PRINT#0;'Select stipple pattern(0 to
 3) then ','press ENTER'
955     PRINT#ch;'qwerty'
960     LET x=CODE(INKEY$(-1))
970     SELect ON x
980       =10:EXIT get_istip
990       =48 TO 51:istip=x-48
1000    END SELect
1030  END REPeat get_istip
1040 END DEFine
```

PROGS

```
1050 REMark ========================================
==========
1060 DEFine PROCedure set_bcol
1070   IF pcol > 3:bcol=2:ELSE :bcol=7
1080   REPeat get_bcol
1085     BORDER #ch,bsize,bcol:CLS#ch
1090     CLS#0:PRINT#0;'Select border colour & pre
ss ENTER'
1100     LET x=CODE(INKEY$(-1))
1110     SELect ON x
1120       =10:EXIT get_bcol
1130       =48 TO 55:bcol=x-48
1140     END SELect
1160   END REPeat get_bcol
1170 END DEFine
1180 REMark ========================================
1190 DEFine PROCedure set_bxor
1200   bxor=bcol
1210   REPeat get_bxor
1215     BORDER #ch,bsize,bcol,bxor:CLS#ch
1220     CLS#0:PRINT#0;'Select colour for BORDER s
tipple and/or',' press ENTER'
1230     LET x=CODE(INKEY$(-1))
1240     SELect ON x
1250       =10:EXIT get_bxor
1260       =48 TO 55:bxor=x-48
1270     END SELect
1290   END REPeat get_bxor
1300 END DEFine
1310 REMark ========================================
==========
1320 DEFine PROCedure set_bstip
1330   bstip = 3
1340   REPeat get_bstip
1345     BORDER #ch,bsize,bcol,bxor,bstip:CLS#ch

1440 REMark ========================e pattern(0 to
 3) then ','press ENTER'
1360     LET x=CODE(INKEY$(-1))
1370     SELect ON x
1380       =10:EXIT get_bstip
1390       =48 TO 51:bstip=x-48
1400     END SELect
1420   END REPeat get_bstip
1430 END DEFine
1440 REMark ========================================
==========
1450 DEFine PROCedure set_bsize
1460   bsize=1:IF pcol>3:bcol=2:ELSE :bcol=7
1470   REPeat get_bsize
1475     BORDER #ch,bsize,bcol:CLS#ch
1480     CLS#0:INPUT#0;'Input a border size & pres
s ENTER'\'To Quit this stage press ','ENTER again:
-';x$
1490     IF x$='':BORDER #ch,bsize,bcol:CLS#ch:RET
urn
1500     x='0'&x$
1510     IF 2*x<right_ AND 2*x<down_:bsize=x
1530   END REPeat get_bsize
1540 END DEFine
1550 REMark ========================================
======
1560 DEFine PROCedure output_file
1565   REPeat get_drive
1570     CLS #0:INPUT #0;'Save PROCedure "window_'
&ch&'" ','to which drive?'\'e.g. MDV1, RAM2... (nu
ll to quit)';x$
1580     IF x$='':RETurn
1585     IF LEN(x$)>4:IF x$(5)="_":x$=x$(1 TO 4):E
ND IF :END IF
1587     IFLEN(x$)=4:EXIT get_drive
1589   END REPeat get_drive
1590   name$=x$&'_window_'&ch
1595   CLS#0:PRINT#0;'Saving ';name$;' contents ar
e:-'
1600   DELETE name$
1610   OPEN_NEW #15,name$
1620   lno = 30000 + ch
1630   ln$=lno & ' def proc window_' & ch & ':'
1640   ln$=ln$&'open #'&ch&',con_'&right_&'x'&down
_&'a'&left_&'x'&top_
1650   ln$=ln$&':paper #'&ch&','&pcol
1660   IF pcol<>pxor:ln$=ln$&','&pxor&','&pstip
1670   ln$=ln$&':ink #'&ch&','&icol
1680   IF icol<>ixor:ln$=ln$&','&ixor&','&istip
1690   ln$=ln$&':border #'&ch&','&bsize&','&bcol
1700   IF bcol<>bxor:ln$=ln$&','&bxor&','&bstip
1710   ln$=ln$&':cls#'&ch&':end def'
1720   PRINT #0;ln$:PRINT#15;ln$
1730   CLOSE#15
1740 END DEFine
1760 REMark ========================================
=========
1790 DEFine PROCedure set_window (ch)
1795   OPEN#ch,con_
1800   CLS#0:PRINT#0,'Move cursor to top left corn
er & ','press space'\\
1805   PRINT#0;'Use "shift" to speed things up a b
it'
1807   top_=0:left_=0:right_=10:down_=10
1810   REPeat topleft
1820     WINDOW #ch,right_,down_,left_,top_
1830     BORDER #ch,1,2
1835     CLS#ch
1840     LET x=CODE(INKEY$(-1))
1850     step_=1:SELect ON x=196,204,212,220:x=x-4
:step_=8
```

```
1860      SELect ON x
1870        =192:left_left
1880        =200:left_right
1890        =208:top_up
1900        =216:top_down
1910        = 32:EXIT topleft
1920      END SELect
1930      BORDER #ch,1,0
2
2000      LET x=CODE(INKEY$(#ch,-1))
2010      step_=1:SELect ON x=196,204,212,220:x=x-4
:step_=8
2020      SELect ON x
2030        =192:right_left
2040        =200:right_right
2050        =208:down_up
  WINDOW #ch,right_,down_,left_,top_
1990      BORDER #ch,1,2
2000      LET x=CODE(INKEY$(#ch,-1))
2010      step_=1:SELect ON x=196,204,212,220:x=x-4
:step_=8
2020      SELect ON x
2030        =192:right_left
2040        =200:right_right
2050        =208:down_up
```

PROGS

```
2060        =216:down_down
2070        = 32:EXIT size
2080      END SELect
2090      BORDER #ch,1,0
2100    END REPeat size
2110 END DEFine
2120 REMark ========================================
==========
2130 DEFine PROCedure left_left
2140    IF left_ - step_ <0:RETurn
2150    left_=left_ - step_
2160 END DEFine
2170 REMark ========================================
==========
2180 DEFine PROCedure left_right
2190    IF left_ + right_ + step_ > 512:RETurn
2200    left_ = left_ + step_
2210 END DEFine
2220 REMark ========================================
==========
2230 DEFine PROCedure top_up
2240    IF top_ - step_ < 0:RETurn
2250    top_ = top_ - step_
2260 END DEFine
2270 REMark ========================================
==========
2280 DEFine PROCedure top_down
2290    IF top_ + down_ + step_ > 256:RETurn
2300    top_ = top_ + step_
2310 END DEFine
2320 REMark ========================================
==========
2330 DEFine PROCedure right_left
2340    IF right_ - step_ < 6:RETurn
2350    right_ = right_ - step_
2360 END DEFine
2370 REMark ========================================
==========
2380 DEFine PROCedure right_right
2390    IF left_ + right_ + step_ > 512:RETurn
2400    right_ = right_ + step_
2410 END DEFine
2420 REMark ========================================
==========
2430 DEFine PROCedure down_up
2440    IF down_ - step_ < 3:RETurn
2450    down_ = down_ - step_
2460 END DEFine
2470 REMark ========================================
==========
2480 DEFine PROCedure down_down
2490    IF top_ + down_ + step_ > 256:RETurn
2500    down_ = down_ + step_
2510 END DEFine
30100 REMark open#3;ser1oh:print#3;chr$(15):list#3
:print#3;chr$(18);chr$(10);chr$(10)
```

How to write for The Progs

If you have written a program and would like to have it published in the Progs send it to:
The Progs
Sinclair QL World
79–80 Petty France
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We will evaluate your submission and, if it is suitable, retain it for future publication. Programs should be supplied on a Microdrive cartridge accompanied, if possible by a printed listing 50 columns wide. Please ensure that your name, address and telephone number are written on the cartridge as well as other documentation.

If you are submitting a machine code program, please provide a SuperBasic listing with Hex loader and checksum in addition to object code.

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READY TO RUN SOFTWARE

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[redacted]

Program Of The Month for February is Window Designer by Neil Taylor. It enables you to design windows as you see them on-screen and writes the relevant SuperBasic code for inclusion in your program. Window size and shape can be altered easily, as can all other parameters such as ink, paper and border colours.

Unlike the listing in The Progs, the version of Window Designer available from Microdrive Exchange is Supercharged and so is fast and efficient, as well as being easy to use. Full instructions are supplied in a Quill_Doc file.

[redacted]

Listed are programs which have appeared as listings in *QL World/QL User* and *Sinclair QL World.*

To the right of each program entry is a small box, which you should mark with a bold cross if you want to order that program.

Once you have put a cross next to all the programs you wish to have copied on to Microdrive, complete the rest of the order form and send it with your PO/cheque AND BLANK FORMATTED DRIVE to:

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If you wish us to supply the drive, please add an extra £2.50 for every drive required and mark the order form appropriately.

Please allow 28 days for delivery.

[redacted]

Composer, by James Lucy, is the latest Microdrive Exchange program to undergo compilation. Just to be different, Lucy has compiled the program with Q-Liberator from Liberation Software.

The program now loads and runs much faster and has some other enhancements. Three new commands have been added, including a routine to produce printed sheet music. All of which makes Composer the definitive QL utility for the aspiring musician.

ORDER FORM

Author	Language	Program Name	Price	Issue	Size
Giles Todd	(B)	**DIY Assembler**	£5	Mar/Jun	120☐
Converts Assembler source into m/c object code					
Richard Cross	(AO)	**Mini Monitor**	£3	Oct	60☐
Pocket-sized monitor with comprehensive facilities					
A Didcock	(B)	**Connect4**	£1	Sept	15☐
Pit your wits against the QL					
Shergold & Tose	(B)	***Golf**	£2	May	35☐
From fairway to green on 50 courses of varying difficulty					
Williams & Holliday	(AO)	**Paladin**	£5	Apr	70☐
The basis of our games programming series — a Space Invaders type-game written entirely in machine code					
Richard Cross	(MB)	**Sprite Animation**	£2	Apr	50☐
A subtle blend of machine code and SuperBasic which produces a versatile sprite designer and high-speed animator					
Steve Deary	(B)	**Pacman**	£1	Mar	20☐
A reasonably fast rendition of the famous arcade favourite					
Andy Carmichael	(B)	**Family Tree**	£3	Aug	100☐
Archive program and database for setting-up and displaying large family trees					
James Lucy	(L)	**Composer**	£3	Oct	50☐
Composer and play sheet music on the QL					
Mathew Capp	(B)	**Miners**	£2	Aug	30☐
A nail-biting management simulation which puts you in charge of the NCB					
P J Smith	(B)	***DIY Adventure**	£1	Feb	60☐
A skeleton framework where you have to slot in the details to create your bespoke adventure					
R Green	(B)	**Othello**	£1	Aug	25☐
A 3D version of the well-known board game Othello for one or two players					
S J Ackers	(S)	***Touch Type**	£4	Aug	80☐
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Rob Sherratt	(AO)	**FCOPY**	£4	Mar'86	80☐
A machine code Microdrive utility for turbocharged file copying					
Alan Prior	(B)	**World Map**	£2	Mar'86	80☐
A high-resolution multi-coloured map of the world for geography buffs					
J M Dower	(B)	**Mushyman**	£2	Jun/Jul'86	15☐
Mushroom munching arcade action					
Tony Quinn	(S)	***CAD QL**	£4	Sept'86	180☐
Professional features include rubber banding and user-definable symbol library					
Stuart Campbell	(MB)	**Attack of the Things**	£3	Oct'86	45☐
Can you repulse the attacking Things?					
Karl Jeffery	(MB)	**Starport 2001**	£3	Nov'86	40☐
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Marcus Jeffery	(S)	**QL Go**	£4	Apr/May'86	40☐
A must for strategy games enthusiasts					
J P Hartrey	(B)	**Britain**	£2	Nov'86	20☐
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KBG Judson	(B)	**Darts**	£2	Dec'86	30☐
The popular pub pastime in pixels					
Neil Taylor	(S)	**Window Designer**	£2	Feb'87	40☐
On-screen window designer					

B = SuperBasic, AO = Assembler + Object Code (ready to run), MB = Machine Code + Basic Loader, S = Supercharged, L = QLiberated

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093 924 621
Utilities

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Utilities

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Utilities

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Quanta
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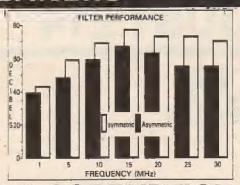
COMPUTER CLEANERS



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FOR THE QL BY GAP SOFTWARE

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FRONT PAGE

...is supplied as two cartridges and a user manual. It is complete, ready to use. Now it is possible to try desktop publishing for yourself for only

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Yes, the QL can now do desktop publishing, and can do it economically!

FRONT PAGE allows you to do something USEFUL with your QL. Design your own artwork, produce your Company newsletter, make up leaflets quickly.

AND DO IT ECONOMICALLY!
FRONT PAGE is:
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HERE IS A SUMMARY OF THE FACILITIES:

800×800 pixel drawing area.
Supports all QL text sizes.
Alternative font.
Very simple text entry.
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DJW Software (QLW4), 11 Pound Close, Bramley, Hants RG26 5BL.
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THE ULTIMATE POOLS PREDICTION PROGRAM

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Press a key and the screen you are working on is saved instantly! Enter a Superbasic Keyword and all you want to know is displayed on screen, return to basic and continue programming! Flip between screens to check syntax etc. Contains ALL Superbasic commands and much more. Create your own help files with Quill. "A very well planned programm . . . for my money this is Breakthrough's piece de resistance . . . the BEEP demo is one of the best I have seen". *QL World 1986.*

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"Breakthrough has accomplished its goal of providing inexpensive, highly useful and easy-to-drive programs, admirably. Very highly recommended". QL WORLD Dec 1986.

BREAKTHROUGH SOFTWARE, 17 SHAFTESBURY WAY, ROYSTON, HERTS, SG89DE. Tel (90763) 45482

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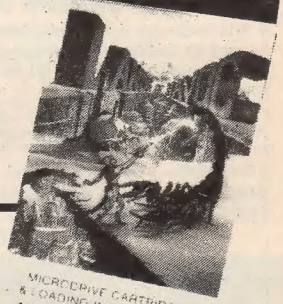

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CST QL Expansion

from the creators of . . . Thor

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Ram Drive

The Ram Drive device driver allows free memory to be used as though it were a very high speed disc, in fact the fastest such device when used with the RAM-plus. Ideally used for the storage of temporary results, or multiple screen images for animated displays, it also eases the copying of files in single disc systems. The Ram Drive can only use memory which is free, so the full advantage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ram Drive is also available on 3·5″ and 5·25″ floppy disc.

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Thor

The CST Thor is the ultimate development of the QL. Available in single and dual floppy and 20M SCSI Winchester models each with 640K RAM, parallel printer and mouse ports, battery-backed clock and separate 84 key PC-AT style keyboard, it is built into an attractive metal case with internal power supply and expansion slot for peripherals. Supplied with many unique extensions to QDOS including multitasking at a single key-stroke, enhanced screen windowing and making full use of all the keys on the full-travel keyboard, the Thor is supplied with a specially commissioned version of the Psion Xchange software suite, and a comprehensive manual. Contact your distributor for details.

CST

Cambridge Systems Technology
24 Green Street, Stevenage, Herts SG1 3DS
Telephone: Stevenage (0438) 352150

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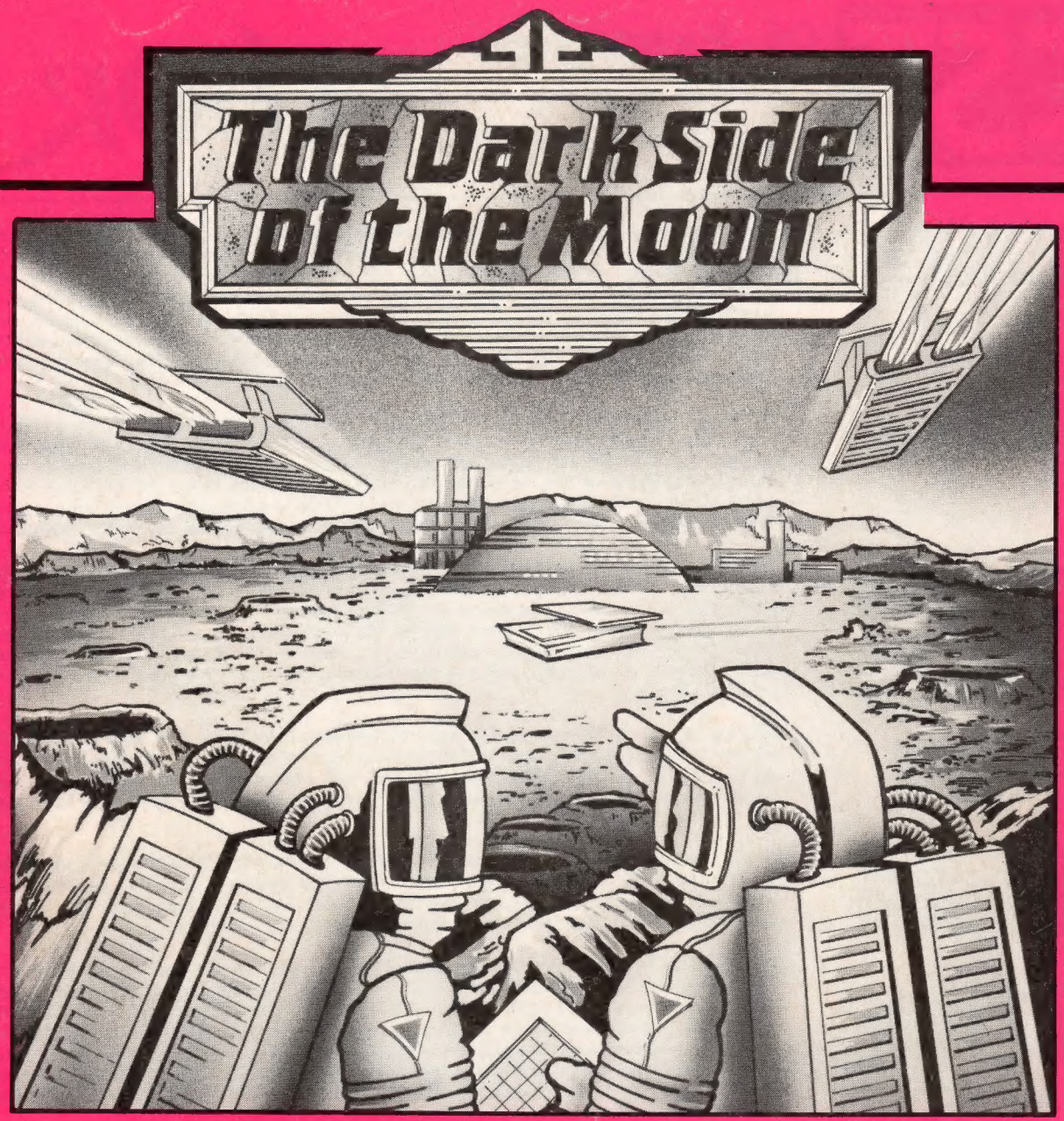

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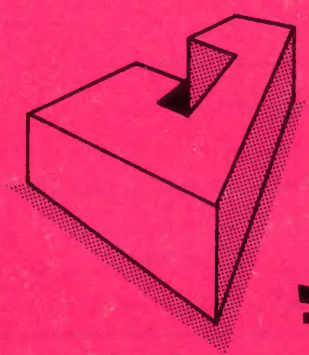

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